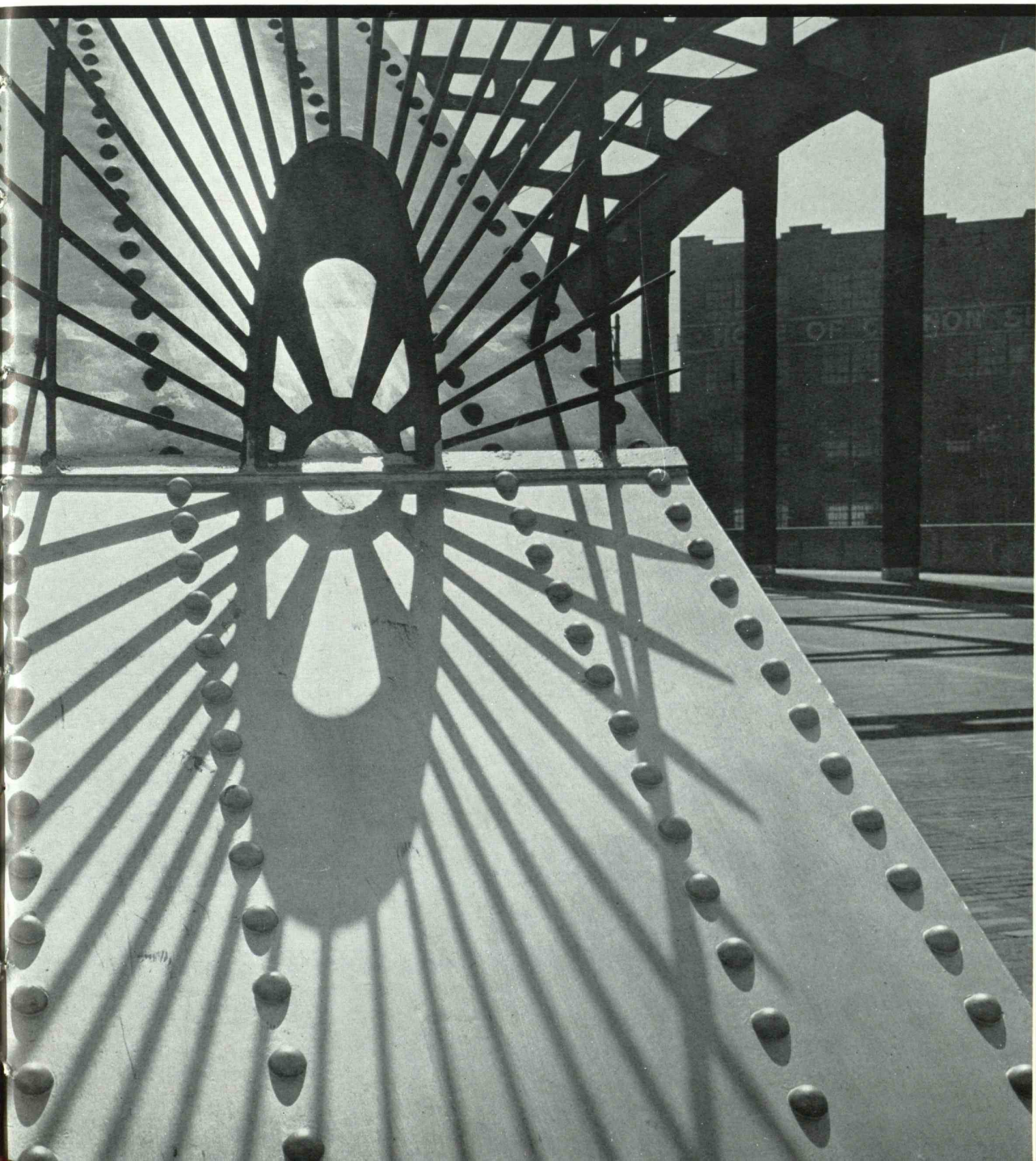
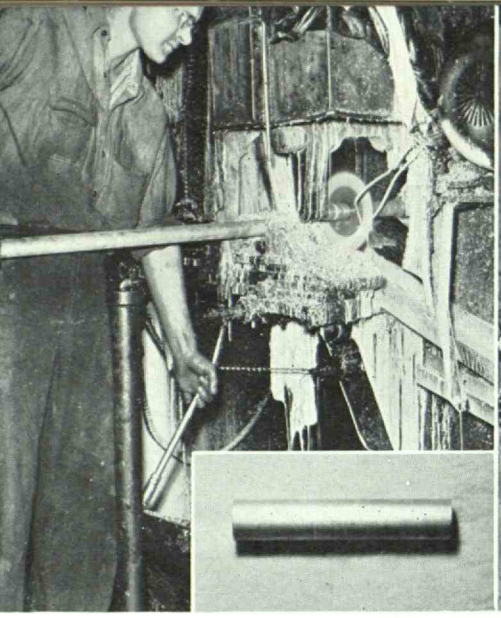
TECHNOLOGY REVIEW

December 1948

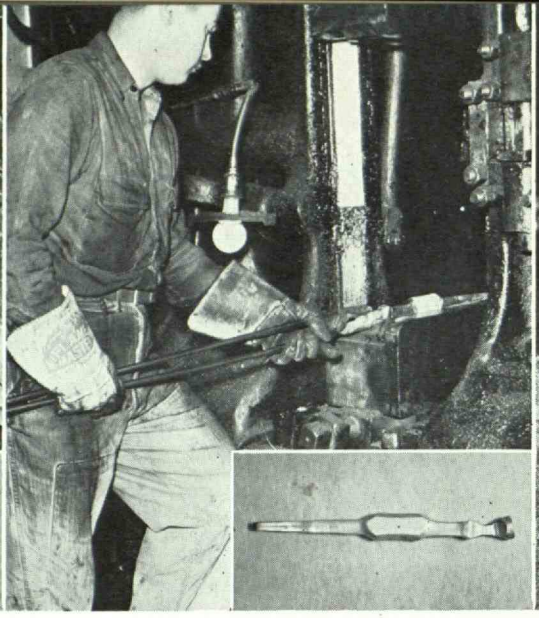


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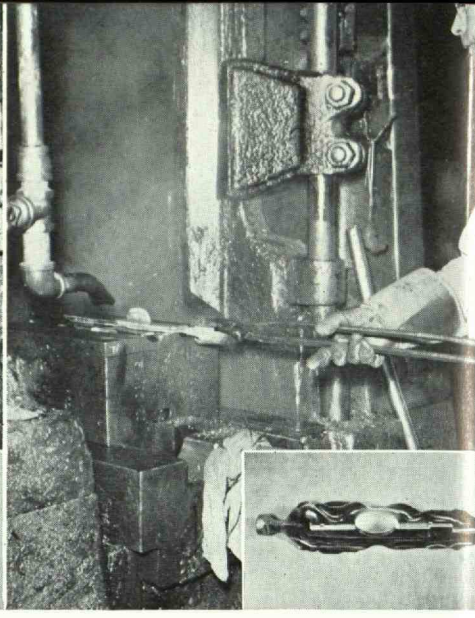
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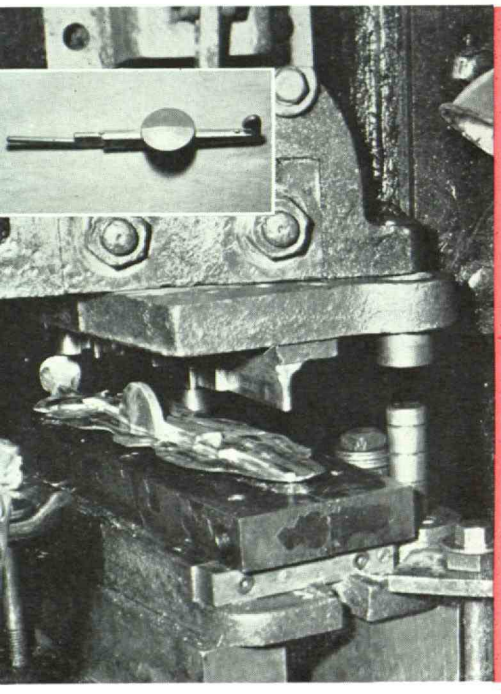
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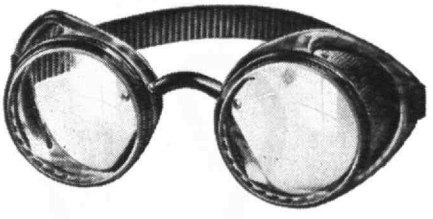
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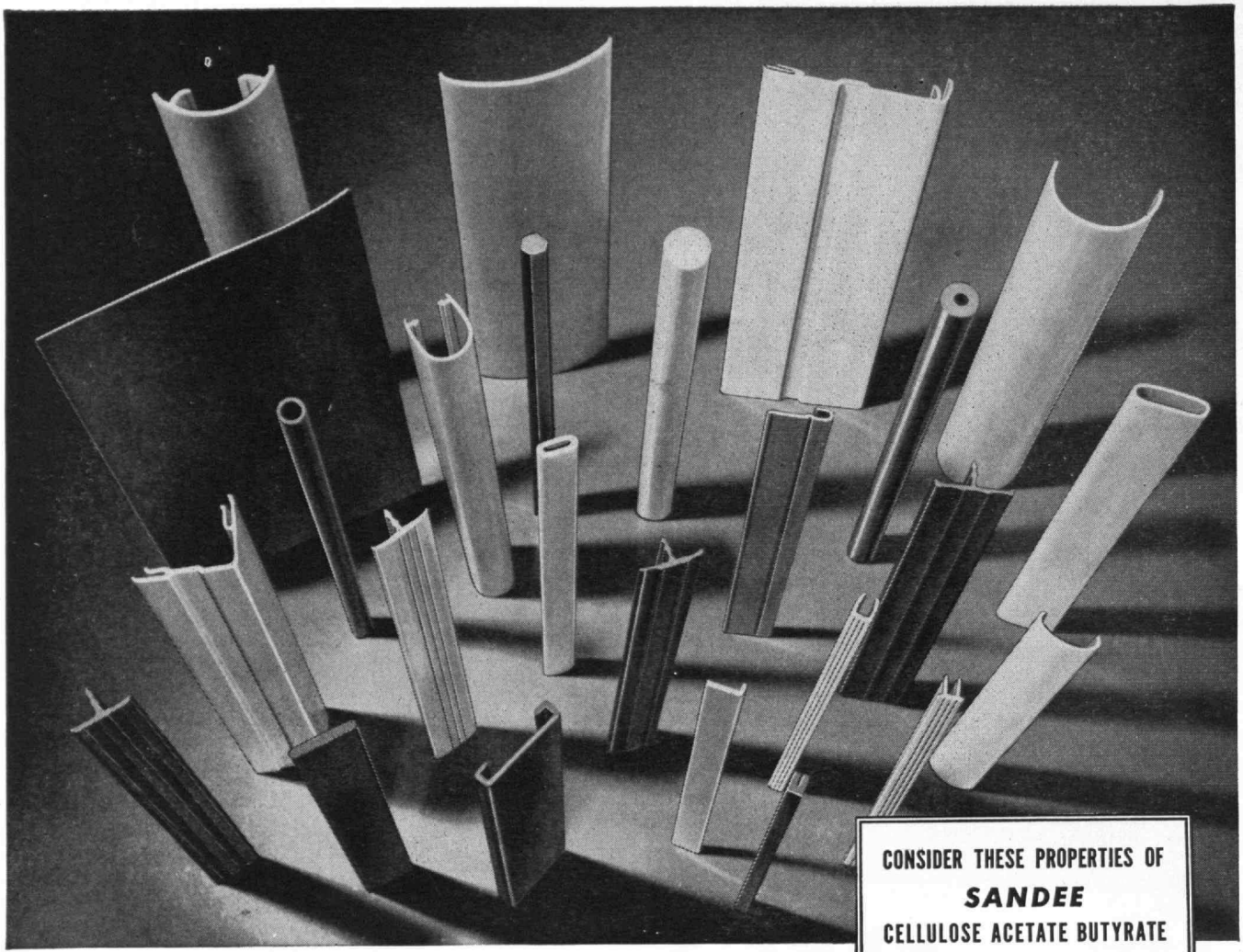


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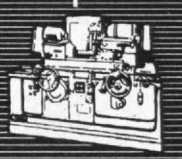
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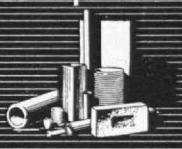
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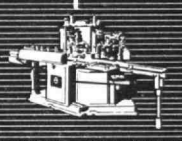
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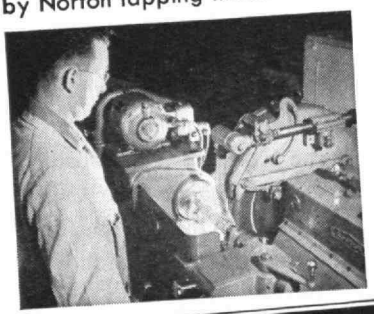


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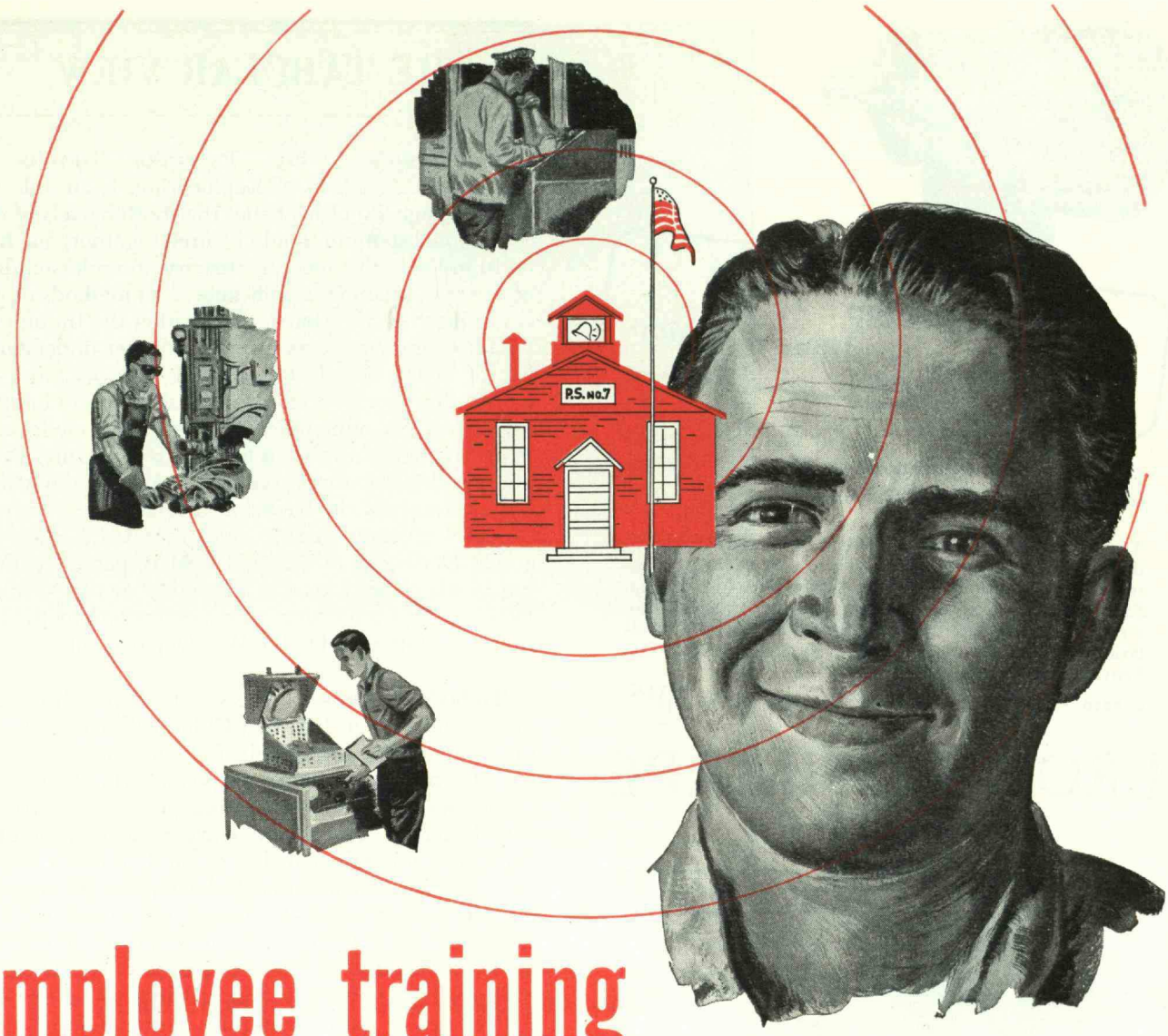
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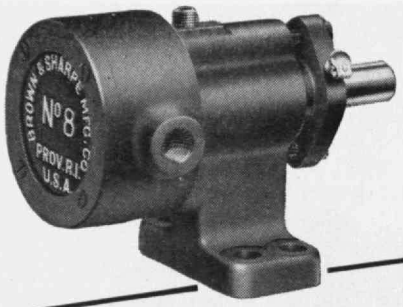
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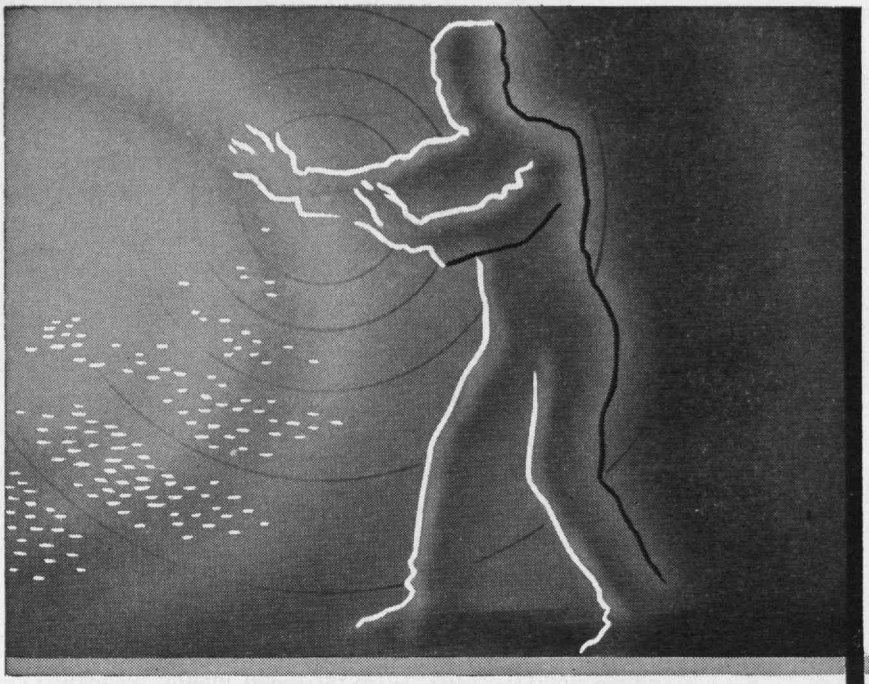
THE TABULAR VIEW

Tomorrow's Living. — PROFESSOR THOMAS K. SHERWOOD, '24, Dean of Engineering, is an able expositor (page 98) of his belief that both barrels of our educational shotgun should be fired together; one barrel to instill in the general citizenry an understanding of the true meaning, significance, and methods of science, and the other barrel to broaden the training of scientists and engineers through a better understanding of economics, history, social sciences, and the many other topics which can be conveniently lumped together as the humanities. In this way he envisions a more intelligent approach to tomorrow's living. Dean Sherwood is scientist turned educational administrator. He received the bachelor of science degree from McGill University in 1923, and from M.I.T. the S.M. and Sc.D. degrees in 1924 and 1929, respectively. During World War II he was a member of the National Defense Research Committee, a consultant on the Baruch Committee and to the War Department.

Today's Progress. — TENNEY L. DAVIS, '13, turns up evidence (page 101) that Chinese warriors of centuries ago were formidable foes, having developed rocket-arrows for military purposes certainly as early as the Seventeenth Century and possibly as early as the Thirteenth. The documentary evidence which Dr. Davis has unearthed in his research for this article gives ample evidence that today's progress depends on past accomplishments. As an authority on modern explosives, an able historian for chemistry, and a frequent contributor to learned journals, Dr. Davis is well qualified to prepare this article for The Review. At Harvard he received an A.M. degree in 1915 and a Ph.D. degree in 1917. He was a member of the Institute's Faculty from 1919 until his resignation in June, 1942. He is director of scientific research and development of National Fireworks, Inc.

Yesterday's Tribute. — In spite of the doctrines of dictators, to the contrary, science knows no nationality; although the barriers of language may temporarily hold men of science apart, their professions bring them together. No better example could be cited than the tribute which a German scientist paid to a modest French professor of mathematics somewhat more than half a century ago when feelings of nationalism were probably at their height. DAVID and CHARLOTTE B. LANDAU record (page 103) the warm, personal life of André-Marie Ampère, and the part which Helmholtz played in immortalizing the French savant. In New York, David Landau follows his vocation as engineer, specializing in stress studies and elastic theory, whereas Charlotte B. Landau, a graduate in science from French schools, is a teacher and writer on science and scientists.

Enzyme Kinetics. — SAMUEL A. GOLDBLITH, '40, whose Trend piece appears on page 97, is a graduate student in the Department of Food Technology where he is studying for an advanced degree.



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FROM GODFREY L. CABOT, '81:

I notice on page 40 of your November, 1948, number that Henry Richards of the Class of 1871 has celebrated his 100th birthday. If I correctly understand it, he is the brother of the late Robert H. Richards of the Class of 1868 who also lived to pass his 100th birthday. I do not recall any other authenticated case in history of two members of one family reaching and passing the age of 100 years.

Boston, Mass.

Music and Mechanism

FROM HERBERT V. WHITE:

Last summer a friend gave me a copy of the June, 1948, issue of The Review. His primary purpose in doing so was that I might see the photograph on the front cover. Due to the fact that I am an organist, this photo was of much interest to me. However, I am unable to identify the organ pictured. Would you kindly send me, at your earliest convenience, any information which you might be able to obtain on the instrument.

Hartford, Conn.

[*As we informed Mr. White and the many other inquirers about this photograph, the organ console pictured is located at Wanamaker's store in Philadelphia. – Ed.*]

Bouquets for Volume 50

FROM CARL T. KELLER:

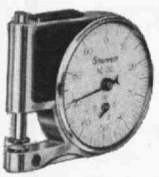
I hate to inflate your ego any further, but in justice to the men who really do the work, I state that the last [July] number of The Review was not only the best, to my mind, of all the many issues of that excellent magazine which I have read, but the best of any such publications which I have ever seen. Even Mrs. Keller read parts of it with interest and I devoured it from "kiver to kiver"! I am keeping it amongst my treasures. My congratulations and keep it up!

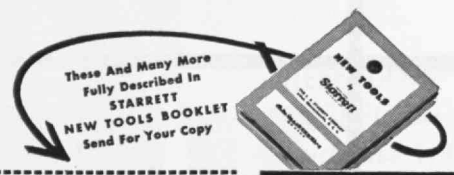
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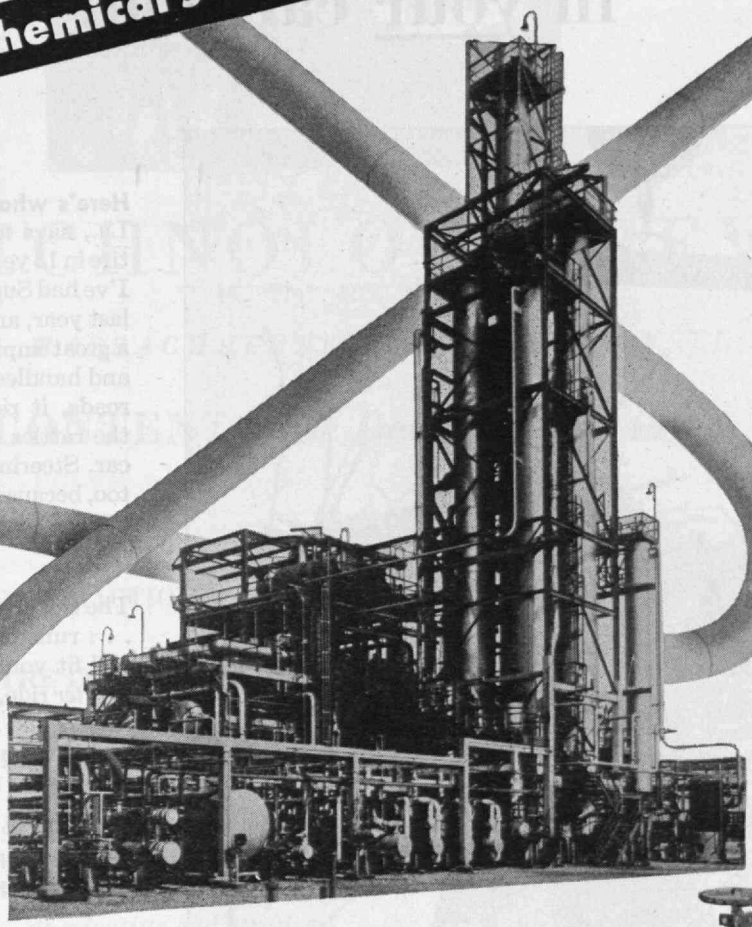
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Long range thinking, good engineering, careful planning by Jefferson Chemical Company and Lummus are reflected in the performance of this ethylene plant at Port Neches. This plant is producing high yields of ethylene from varying charge stock compositions. When shut down for scheduled inspection after five months initial run, turnaround was completed in about fourteen days. Examination showed equipment to be unusually clean and in good mechanical condition.

Playing an important part in the high yields of this ethylene plant are the Lummus Cracking Heaters, especially designed to obtain required temperature-time relationship with minimum coke deposition. On-stream periods of two months have been obtained and there are good possibilities of extending these periods.

Including an ethylene plant now under construction, Lummus has designed four plants for the production of ethylene from petroleum, with a total capacity of approximately half million pounds per day.

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Earl Wood

THE TECHNOLOGY REVIEW

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EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CONTENTS *for December, 1948* VOL. 51 No. 2

ABSTRACTION · *Photograph by A. Aubrey Bodine* THE COVER

THE INVADER · *Photograph by Ward Allan Howe* FRONTISPIECE 94

PUTTING MOTHER NATURE TO WORK BY SAMUEL A. GOLDBLITH 97

SCIENCE IN EDUCATION BY THOMAS K. SHERWOOD 98

A double purpose of our educational system might well be to acquaint the citizen with the true meaning of science, while broadening the training of scientists and engineers in the humanities

EARLY CHINESE ROCKETS BY TENNEY L. DAVIS 101

The old adage that "there's nothing new under the sun" is borne out by a Seventeenth-Century Chinese treatise on military equipment

ANDRÉ-MARIE AMPÈRE BY DAVID and CHARLOTTE B. LANDAU 103

Signal honor comes to a modest French professor through the proposal of the German, Helmholtz, in naming the practical unit of electric current

THE TABULAR VIEW · *Contributors and Contributions* 86

MAIL RETURNS · *Letters from Review Readers* 88

THE TREND OF AFFAIRS · *News of Science and Engineering* 95

THE INSTITUTE GAZETTE · *Relating to the Massachusetts Institute of Technology* 109

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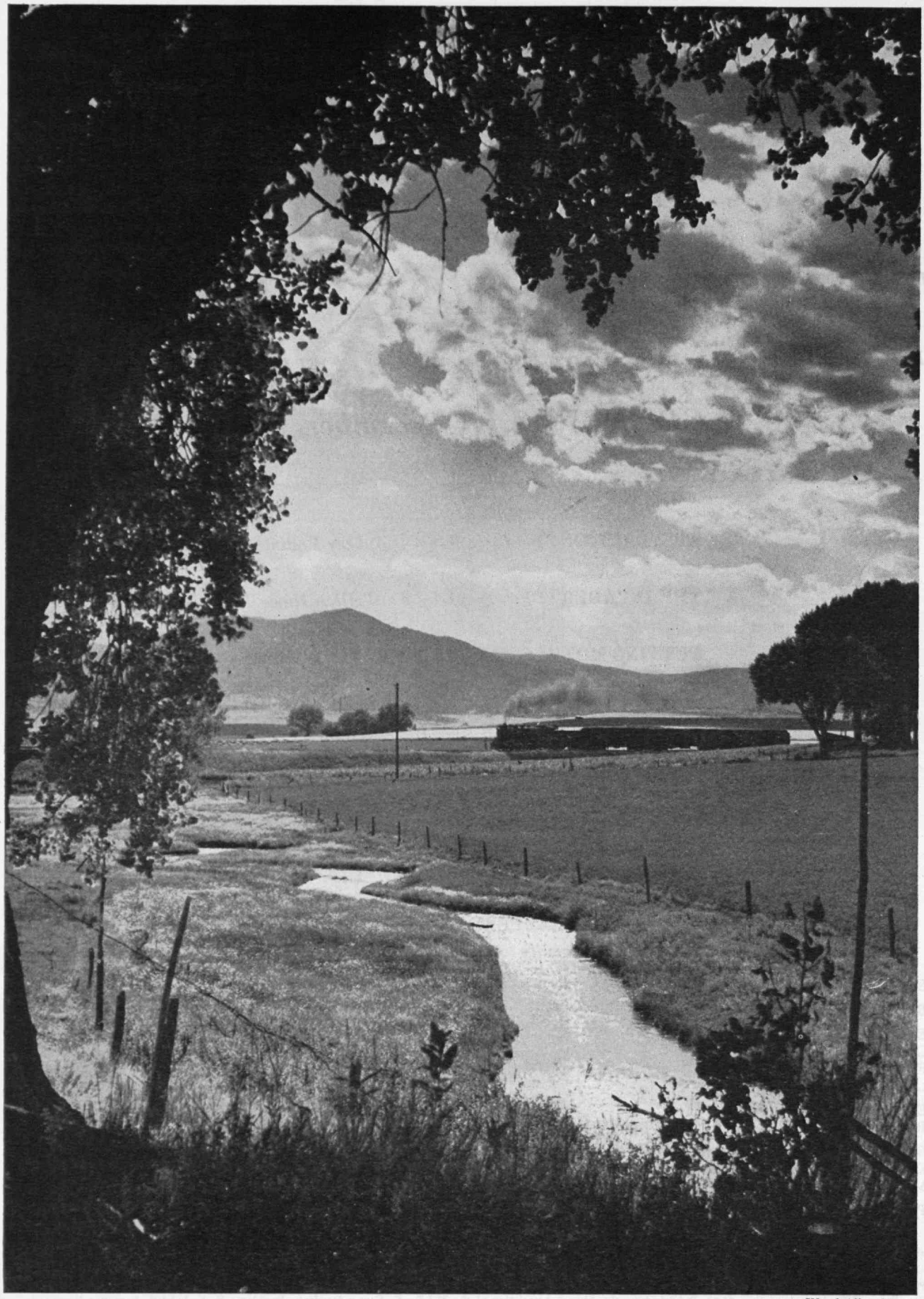
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Ward Allan Howe

The Invader

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The Trend of Affairs

Bountiful Bossy

THERE are now one fifth as many dairy cows as persons in the United States. And by diverting Bossy's milk secretion from its original purpose of nurturing her calf, man has gained not only an important element of his food supply,* but also an extensive array of valuable nonfood products.

One serious difficulty in the economy of the cow has been the problem of by-products. Even calves may be by-products, for often the main purpose of calving is to freshen the cow's flow of milk. Furthermore, only half of the milk produced in this country is consumed as such; the remainder is used to make cream, butter, or cheese. Separation of cream leaves skim milk as a by-product; butter production leaves buttermilk; and cheese manufacture leaves whey. But in each process the by-product amounts to well over 90 per cent by weight of the original milk.

Originally skim milk, buttermilk, and whey were either discarded or returned to farms for feeding to livestock. Later some skim milk, particularly in concentrated or dried form, found its way into the food-manufacturing industries. Nevertheless, these milk by-products, until recently, represented a serious economic loss, as well as a waste of potentially valuable materials. Now, however, such waste has been virtually eliminated by successful application of the chemurgic approach, leading to separation of the by-products into various fractions, for use as such, for modification, or for use as ingredients in the making of numerous valuable products, some of them extraordinarily remote from the original food nature of milk.

The first constituent of milk to find industrial application was casein. Casein is a protein that constitutes some three per cent of whole milk; it is separated from by-product, skim milk, by coagulation, either with acid or with the enzyme, rennet. The original use for casein, and still the largest one, is in coating paper. Casein is also used in adhesives, paints, plastics, rubber, and building materials. Recently, casein fibers have been perfected for use in textiles; these fibers can be made with properties simulating those of the relatively expensive fur and wool. Likewise paintbrush bristles, now made from casein, are said to rival the costly natural hog bristles normally used. Digests of casein, and also of lactalbumin, a secondary milk protein, are used as flavoring materials in food manufacture, for pharmaceutical applications in amino-acid therapy, and also as ingredients in bacteriological media where they supply nutrients for micro-organisms. Calcium or sodium salts of casein are used in infant feeding.

Another milk constituent that falls into the by-product category is the sugar, lactose. Lactose, it is of interest to note, is the only commercially important sugar of animal origin. It is also the largest single component of the solids of milk, as it constitutes approximately five per cent by weight of the average milk. Lactose remains in the whey resulting from cheese manufacture, so that this material, as well as the by-product, skim milk, is a commercial source of the sugar. The uses of lactose are many and varied. Certain of its properties make it uniquely valuable as an excipient and coating in pharmaceutical manufacture. It is frequently used in infant foods. Some processes for penicillin production rely upon lactose as an essential ingredient of the substrate. Lactose also is the raw material for a fermentation process that yields lactic acid, a material widely used in industry.

In addition to the utilization of whey by separating out of lactalbumin and lactose, considerable whey is now used unaltered as the substrate for another industrial fermentation that yields a good vinegar.

As a result of the developments described, little skim milk, whey, or buttermilk need be discarded today. The average cow produces some two tons of milk annually, and now that virtually all, rather than approximately half, of this bountiful flow is being put to useful purposes, Bossy has become still further entrenched as a valuable citizen.

* The Technology Review, May, 1947, page 403.

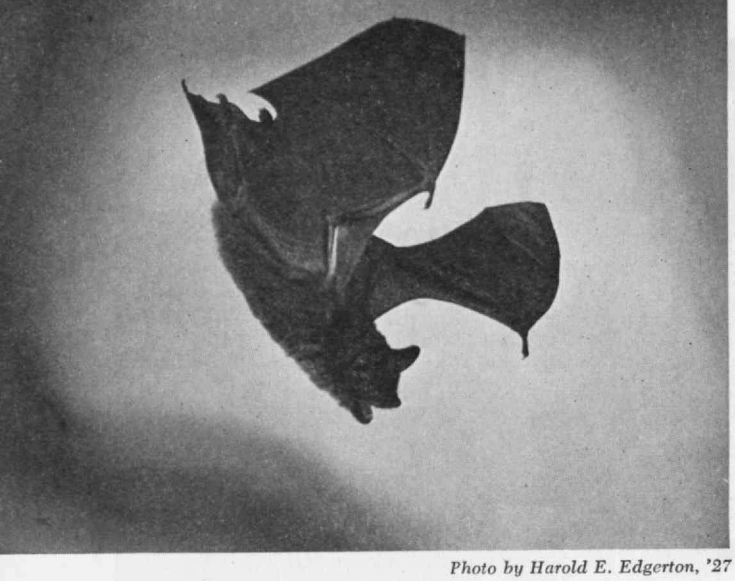


Photo by Harold E. Edgerton, '27

Studies of the metabolism of the bat require an unusual grasp of thermodynamics, as well as of biology, for the body temperature of these flying creatures in flight (about 104 degrees F.) is considerably greater than that at rest.

Internal Environment

IN one of his more celebrated essays, *circa* 1928, "On Being the Right Size," J. B. S. Haldane recounted some of the problems that plague the very large and the very small animals. The immutable laws of geometry ordain that, as long as mammals keep more or less the same shape, the ratio of surface to total weight must go up as their size goes down. It takes about 5,000 mice to weigh as much as one man, but between them the rodents have about 17 times as much skin area. Since they lose about 17 times as much heat as man (the body temperature of mice and men is much the same) the rodents require 17 times as much oxygen to burn the much greater quantities of food they need. In fact, a mouse must consume about one-fourth its weight in food every day.

Shrews, rather than mice, have received the most publicity for their voracious appetites, and they do indeed have record-breaking metabolic rates for mammals, but all small warm-blooded animals are heavy feeders. Their extreme characteristics in this respect have made them of interest to biologists and biochemists, for metabolism and body temperatures are key expressions of body processes. Research in this field is continuous, and although the published papers taken individually may seem as irrelevant as a fragment from a jigsaw puzzle, they fit into a coherent, although intricate, picture. The pages of *Science* during the past year provide the source of information for the following comments.

The minimum size for an adult mammal, says one worker, is 2.5 grams, or about one-tenth of an ounce. That figure was obtained by extending a curve of oxygen consumption per unit of body weight for various species of shrews. As the shrews grew smaller, their unit oxygen intake increased so rapidly that, it was concluded, a shrew weighing a tenth of an ounce would be unable to eat food fast enough to keep living. The young of many small animals weigh less than this minimum, but they escape the paradox of an infinite appetite by keeping their body temperature and their biochemical processes at less than adult levels. The nakedness and sparse feathering of many of these tiny infants may be an evolutionary adaption toward that end.

The bat is also a very small mammal, but has a peculiarity that prevents the scientists from putting a point for him down on the curve. Metabolically speaking, his is a split personality. At rest he has a relatively low body temperature, but when he wants to fly he works himself up to a temperature of 104 or 105 degrees F. (the level for birds) and generates energy at a rate necessary for a flying animal. To maintain that rate while he roosts would greatly increase the bat's food-gathering task, perhaps beyond his capabilities, and so he slips into low gear as a thrift measure.

The bat's behavior has a superficial parallel to that of the cold-blooded land animals, except that the bat can change his level of activity at will, while the poikilotherms, as the biochemists insist on referring to them, are slaves of the daily temperature variations. For fishes in the open sea, there is practically no temperature problem, for the thermal inertia of the tremendous mass of water in which they are immersed protects them from sudden fluctuations. Although a great evolutionary step was required to enable the reptiles and Amphibia to endure temperatures from near freezing to more then 100 degrees F., an existence independent from temperature did not follow. For activities that demand the rapid expenditure of energy, such as food gathering, active defense, or the sexual functions, the cold-blooded animals must wait, in effect, for a sunny day. Nor are they freed from making

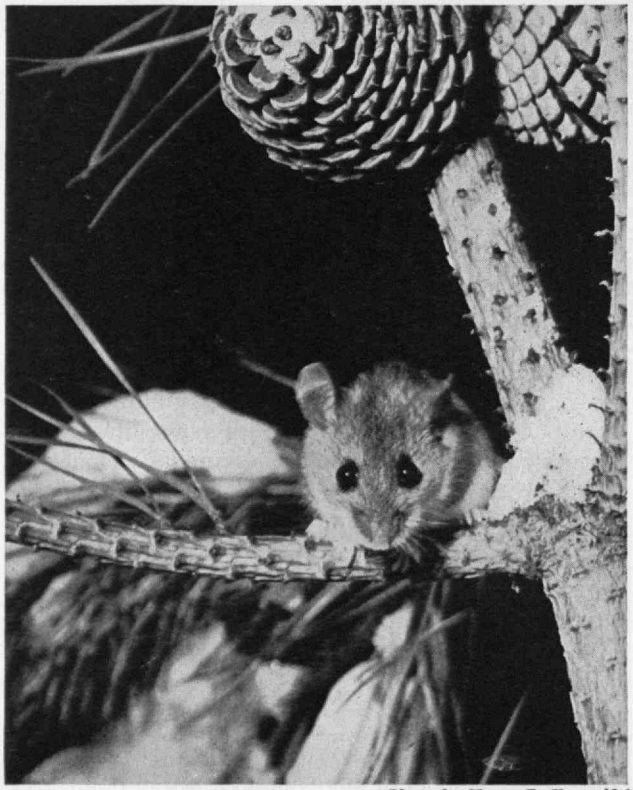


Photo by Henry B. Kane, '24

Because the ratio of skin area to weight in mice is about 17 times that of man, rodents, such as this white-footed mouse, must consume one-fourth of their weight in food each day. The world's population would probably have become static long ago were man required to consume 40 or 50 pounds of food each day to maintain himself.

complex internal changes, for biochemical relationships in a dormant animal are far different from those taking place in animals whose body temperature is that of active mammals.

A few years ago it was shown that the blood pressure varies with the temperature in cold-blooded animals. More recently, the same effect has been shown to exist in warm-blooded animals once the mechanism that controls temperature is overcome. Still more significant is the discovery that warming or cooling of a tiny area in the brain, called the hypothalamus, creates the same effects as warming or cooling the entire animal. The hypothalamus has already been isolated as the control center for a wide group of apparently unrelated functions, such as the metabolism of sugars and fats, and the regulation of the sexual cycle, appetite, and respiration.

The suggested explanation is that "these functions may be considered as parts of an integrative mechanism" that adjusts the internal environment to the existing temperature. Perhaps it was the invention of the hypothalamus that permitted life to walk out of the sea and extend its domain over the land and air.

Putting Mother Nature to Work

By Samuel A. Goldblith

IN considering the utilization of natural forces for power we commonly think of gas, coal, oil, water, electricity, solar energy, and so on. There are minute organic compounds – enzymes – found in all living materials which, serving as organic catalysts, are responsible for many chemical changes which occur in nature. In a sense, these enzymes might also be included in any list of natural sources of energy.

Enzymes are used now in numerous industrial processes. Their commercial use has increased rapidly since 1926 when James B. Sumner first successfully crystallized a pure enzyme, urease. Long before man knew of and had named enzymes, he was making use of them however. The conversion of cider into vinegar (where the enzymes of a group of bacteria, known as the acetobacter, convert the sugar of the cider into acetic acid) is a typical example of an early use of enzymes which survives to the present. The production of alcohol, wherein the enzymes of yeast are used to convert molasses sugar into ethyl alcohol, is another use which man has made of enzymes for countless ages. Beer has been brewed by man long before he knew that this common beverage was the result of the fermentation of starches by the enzymes of yeasts. Moreover, the sprouting of barley results in malt, which is rich in diastatic enzymes, and these break down the starches to simpler sugars in order that the yeast enzymes may convert the sugars to alcohol. Thus the characteristic flavor and stimulation of beer and ale are end results of the action of organic catalysts.

In 1878 Wilhelm Kühne proposed the word "enzyme" meaning "in yeast." It was Louis Pasteur who showed that the fermentations which occur in natural materials are due to the presence of micro-organisms in the fermenting materials. Edward Buchner, in 1897, showed that it was not necessarily the yeasts which fermented materials but rather the enzymes in the yeasts.

To date all of the enzymes which have been crystallized have been shown to be proteins of high molecular weight. Since Sumner's work, some 30 enzymes have been crystallized and studied in minute detail. Although not crystallized as yet a greater number still have been discovered and studied in detail. As a result of recent research, enzymes have been used commercially with much better success than previously. As a result the brewing industry, as well as a number of similar industries, has transformed the art of brewing into a science. Moreover, new improvements in processes result in better products produced at lower costs. This has been made possible as a result of research leading to a more complete knowledge of the chemistry and kinetics of enzymes.

Enzymes are destroyed by heat but are not inactivated by cold; they are less active at freezing temperatures however. Thus, in preparing edibles for preservation by freezing, it is of importance to inactivate the enzymes by a preliminary heating, known as blanching, in order to prevent off-flavor and deterioration of foods. Quantitative measurements of the rates of activity of enzymes at lower temperatures, by Irwin W. Sizer, Associate Professor of Physiology at the Institute, and Edward S. Josephson, '40, have given us a better insight into the necessity of blanching and the methods of determining the proper times and temperatures for proper blanching.

Enzymes are responsible for the proper digestion of foods in man and all animals where they function not only in the digestive tract, but also in the entire body. Man has even found a way to improve his own digestion through the production of enzymes in other animals. Thus, for example, the production of the enzyme, pepsin, from hogs' stomachs has become an important operation in the meat-packing industry. The pepsin thus produced is used medicinally by persons whose stomachs cannot break down proteins into smaller compounds which may become available to the body as building materials. A number of vitamins are a part of the enzyme system of the body which are indispensable for respiration and transport of oxygen.

The number of molecules of substrate which are decomposed per minute by one molecule of enzyme is called the "turnover number" and is a measure of the effectiveness of an enzyme. Catalase, the enzyme which decomposes hydrogen peroxide, has a turnover number of 5,000,000. Thus we see that enzymes can indeed be powerful catalysts, and that only a small amount of enzyme may be required to affect a molecular breakdown of sizable proportions.

The production of nearly all industrial alcohols and many organic compounds is due to the action of the enzymes of micro-organisms. Butyl, ethyl, isopropyl alcohols, acetone, lactic acid, glycerol, and so on are examples of this. The production of pickles, sauerkraut, and fermented milk products is due to the enzymes of the lactic acid bacteria. Cheddar cheese is another example of the action of an enzyme (rennet), obtained by extraction from the fourth stomach of the cow.

Thus we may see that enzymes, the biological catalysts present in all living materials, are of utmost importance to man's economy, and daily research on these is showing more uses.

Science in Education

Our Educational System Needs to —
Broaden Engineers and Scientists in the Humanities,
Provide a Better Understanding of the Real Meaning of Science

By **THOMAS K. SHERWOOD**

In a little more than a year we shall have passed the halfway mark in the Twentieth Century, ending what may prove to be quite the most remarkable and possibly the most significant half century in history. For in my lifetime mankind's accomplishments and general behavior have been paradoxical in the extreme — we have both reached the heights and plumbed the depths. Two wars have caused the death of nearly as many people as there are in the United States today; for this the Grim Reaper's total is at least twice as great as it was for all the war deaths during the preceding 1900 years of the Christian Era. Yet during this same half century, we, in this country, have enjoyed a higher standard of living than the world had previously known. In this same period we have expanded our educational system to the point that there are ten times as many students in college as in 1900, and four times as many students in college as in secondary schools 50 years ago. Outside of schools, education in music and the arts has become common; good music is known and enjoyed by millions of our people. The advances in medicine have done more to relieve our suffering and promote our physical well-being than all that was accomplished in the field of medicine in the previous 20 centuries.

That science has had something to do with the paradox of this half century is evident; science is responsible for both the atom bomb and for penicillin. The importance of science in our daily life and its implications for our future are evidenced by the current interest in all things scientific or technological. There are more students studying engineering today than were enrolled in all colleges in 1900. New magazines of popular science are started almost every month, or so it seems. News weeklies describe the doings of the scientists along with the news from Hollywood, reporting blow by blow the encounters of the research worker with nature's mysteries, telling us what a new synchrotron or telescope will accomplish even before the equipment is completed. Congressional debates on atomic energy or the establishment of a National Science Foundation assume the stature of major political issues. It is significant that such activity reflects much more than merely popular interest in household scientific gadgets — there is a widespread realization that science may have a great deal to do with how we live with each other as well as with the manner in which we live. The atom bomb did more than destroy Hiroshima and Nagasaki: It persuaded us, as nothing else had done, that science is of very great and of very real importance to everyone.

The remarkable developments of science and technology have been enumerated by many writers. What I should like to do is to emphasize the rapidity with which these developments have occurred in this last half century. This is most evident by a survey of the increase in our industrial productivity since Michael Faraday's experiments a hundred years ago laid the foundation of our great electrical industry. In 1944 the net output of the economy of this country was 27 times larger than in 1850 and was turned out by a labor force only nine times larger, working 43 instead of 70 hours each week. In terms of 1944 prices, the net output of all goods and services in 1944 was $161,000,000,000 as against $6,000,000,000 in 1850. The increase raised the average income of Americans from about $270 in 1850 to about $1170 in 1944. Technology is largely responsible for these changes.

The great developments of the automobile and aircraft industry are familiar to everyone. About the time I was born the Wright brothers made their famous first flight at Kitty Hawk. Four years ago the modern version of the Wright machine brought two great nations to their knees. A lesser example of the advance of technology is the improvement in the automobile tire. In 1907 an average workman's wage for one hour was sufficient to purchase 20 miles of tire life; today an average hour's earnings will purchase a tire mileage of 2,120. Technologically, Russia today is about where we were shortly after the turn of the century. A Russian workman must work 320 hours to purchase a cotton shirt; in this country the shirt can be purchased with the average wages for three hours' work. The Russian must work 1,600 hours for a wrist watch; the American, 30 hours. If any Russian felt he needed one, he would work four hours for a toothbrush; the American, 15 minutes.

More important than the development of automobiles, airplanes, and radio sets is the tremendous improvement in our general health and physical well-being. This change is evidenced by the fact that we live very much longer than our forefathers. From studies of the character of fossil remains it is estimated that the average life span of prehistoric man was about 18 years. At the time of the Roman Empire the average lifetime had increased to 22 years, and in the Middle Ages it was about 32 years, which is approximately the figure for India today. When I was born my life expectancy was 49 years, on the basis of which I am not long for this world. Today the life expectancy at birth in the United States is 66 years. More years have been added to man's lifetime since I was born than

during the preceding one thousand years. These changes have been the result of better living environment, better nutrition, and of the advances resulting from the application of science to medicine.

Perhaps the rapidity of the change in our environment is best summarized by quoting from one of my colleagues: "In my own lifetime has occurred the development of every single thing which distinguishes a high from a low standard of living. When I was born the telephone had been invented but was not in use. Electric power, the internal combustion engine, x-rays, moving pictures, the airplane, radio; even central heating, good roads, and a continuous supply of fresh food have all come since I was born. The world into which I was born was more like that of Julius Caesar than like that of the present day." The man who recently said that is 67 years old.

Rapid change often produces stresses, and usually presents new and troublesome problems. Certainly it is important to know whether the change is in the right or wrong direction, but the perspective necessary to evaluate the trend is difficult in a period of rapidly changing conditions. A person's weight may be expected to change gradually over a period of years; a gain or loss of 15 pounds in a few weeks is a danger signal to the physician. A train traveling at high speed around a curve is more difficult to keep on the track. Skiers on a downhill course know well that they must be most keenly alert on the steep pitches. There is little time to size up the bumps in the trail and the branches protruding through the snow. The wind causes their eyes to water, and it is difficult to see ahead. The steep pitches are the most dangerous and difficult parts of the trail, but they are also the most stimulating and exciting. It is for these experiences that people go skiing. We live in a high-speed age, but the rapidity with which our whole way of life is changing is more exciting and more significant than the rate at which our automobiles and airplanes are increasing our speed of locomotion.

What Kind of Higher Education?

The broad picture of rapid change which I have attempted to paint seems to me to have implications of special significance to the field of education. The President's Commission on Higher Education recently suggested the need of college education for a much larger fraction of our young people than are now in colleges, and recommends a program of Federal aid to the end that present college enrollments would be doubled by 1960.

What kind of higher education should the colleges offer? The economic implications alone suggest the need for a most careful scrutiny of the job we are doing in the colleges. Has the character of college education kept up with the needs of this period of rapid change? Can we predict what kind of educational background the middle-aged leaders of the 1970's will need in order that we may make provision for it in our colleges today?

A typical college course of 100 years ago contained approximately six years of Latin and Greek; mathematics through the calculus; surveying and navigation; at least one year each of physics and chemistry; astronomy; a year course each in rhetoric, moral philosophy, political economy, and history. This does not sound greatly different from the liberal arts program of today as elected by most of the students in colleges. The principal difference is that most students today study less science and mathematics than did the college student of 1850. In the face of a revolutionary change in our whole way of living (a change due very largely to science and technology) liberal arts programs today appear to provide graduates with no better basis for understanding science and technology than did the colleges in the nonscientific period of a century ago. It is this aspect of present-day higher education which concerns educators and which, undoubtedly, should be corrected.

Changing the Curriculum

Scientists and engineers represent a very small fraction of our population, and perhaps too much has been assumed as to their ability to understand and be responsible for the implications and applications of what they do. The Brazilian delegate to the United Nations, Oswaldó Aranha, has said: "The people that disintegrated the atom now have the mission of integrating humanity." But we must not assume that the "people" who will do this are Doctors Oppenheimer, Urey, Fermi, Compton, Seaborg, and the rest of the small group who get the credit – and the blame – for the atom bomb. Those who must do this are all of us, most of whom are graduates of liberal arts colleges. It seems extremely important that these people know more about science and technology if they are to shoulder their great responsibilities as citizens.

Tinkering with the curriculum is the favorite indoor sport of educators, especially of college faculties and college administrators. In recent years the pendulum has been swinging back from the free elective system, and the tinkering has frequently resulted in the requirement of a series of subjects to be taken by all undergraduates in the college. The object is to provide a general education by insistence on a "common core" and the new curricula are not unlike those described as common in 1850. One of the difficulties in providing this common core of required subjects is that the elementary courses in such branches of learning as economics, mathematics, or chemistry are designed as the first of a sequence of subjects for students majoring in the field, and are not planned for the many students who want to know about the subject but who do not wish to specialize in it. As a basis for further work in chemistry, the freshman course in chemistry is usually excellent, but is not particularly helpful to the future banker or farmer who should know something of the nature of science and of the way chemists think. To overcome this difficulty, Harvard, Colgate, and a number of other universities have instituted new subjects in general science, designed to stress the way in which science progresses, to show how scientists work and reason, and to indicate something of the possibilities and limitations of science in relation to the problems of nonscientists. This is an excellent idea, and this type of subject should grow in importance in the educational scheme, provided the pitfalls of the Cook's-Tour type of survey course can be avoided.

Science in Our Daily Life

Just why is it important for nonscientists and nonengineers to know more about science and technology? It is important because nontechnical persons have the responsibilities of citizens, and science and technology are important influences on their daily life. A few illustrations will make this point clearer.

The whole public discussion of atomic energy has been distorted by the failure of our people to appreciate the technology of bombmaking. From the newspaper accounts one would get the idea that the secret of the atom bomb might be written on a piece of paper, like a chemical formula, and sold to a foreign spy. Those who know a little about technology will tell you that it would be nearer the truth to say that there is no secret; that Russia's job of making an atom bomb is more nearly comparable to the difficulty the Chinese would have in setting up a plant to make 3,000 Fords a day. The difficulty is not so much with a few processes or reactions, which have been kept confidential, as it is with the complexity and size of the undertaking.

There has been a great deal of talk about atomic power plants, and there is even some disappointment that they are not yet in operation. Those who have a general knowledge of power production will tell you that the cost of coal, the source of energy, is only some 20 per cent of the price paid for electric power. It follows that if atomic energy were free, which certainly will not be the case, the reduction in electric power bills would hardly be enough to notice.

Economics and Atomic Power

During World War II we constructed a half-billion dollars' worth of plants for the manufacture of synthetic rubber, and did it in record time. Now that the war is over, we can return to the use of natural rubber, which we can buy at a relatively low price, thanks to the low living standards of the natives of the East Indies. But we are now faced with the obsolescence of these synthetic plants, and we may well ask, "What should we do?" Should the government rubber plants be subsidized in order that we may retain an emergency rubber-producing capacity of use in case of a national emergency? Can such plants be placed in a stand-by condition and be operable years later? Are the butylenes, required in the manufacture of synthetic rubber, waste by-products of the petroleum industry, or does their use cut into our dwindling petroleum reserves? Should we take advantage of the native who will send us rubber in return for two bowls of rice each day? These are questions for United States citizens, and they are very live ones today. They are all practical problems stemming from our technological progress.

For a number of years we have heard depressing estimates of the petroleum reserves of this continent. Fifteen years ago it was estimated that we would be out of oil in 15 years, and perhaps we have heard the cry "wolf" too often, for few of us seem to be worrying. Mr. Krug, Secretary of the Interior, who is definitely worrying, recommends the construction of a new synthetic gasoline industry which would take years to build, and would cost nine billion dollars. Does such a proposal as this make sense? Are we really almost out of oil? Should we make gasoline from coal, or from oil shale, or from natural gas? If it is a good idea why aren't the oil companies doing it? Are the processes to be used well established in laboratory and pilot plant, or would the new plants become obsolete soon after completion? Are the 18,000,000 tons of steel needed for plant construction a small or a large item in our economy?

These are important matters of national concern, but I do not mean to imply that each of us need be well informed as to the technical details of such questions, many of which must be solved by Congress or by other government groups. Nevertheless, individual citizens should have some basis for judging not only the proponents of plans to solve such problems, but the arguments on which the plans are based. They should, for example, read Mr. Krug's proposal with some understanding, not judge it on the basis of their reaction to Mr. Krug's picture in the newspaper.

So that Rational Judgment May Be Possible

Nor do I plead for science and technology as a part of a general education solely that adults may better understand national questions. Anyone who invests money or starts a business needs much more general knowledge of technology than was required a generation ago. Should the young graduate go into his father's wool business, or is it really true that good synthetic wool is "just around the corner," and that its production will make his importing business obsolete, along with the continent of Australia? The other day a cousin wrote me about an inventor he had met in Nebraska. It was reported that this man had developed a sort of radio set with an antenna capable of extracting enough electricity out of the clouds to light six 30-watt electric light lamps. On the basis of this communication, should I cash my war bonds and buy stock in this development, or am I sound in advising my cousin that the inventor is doubtless misguided? Fifty years ago people didn't buy toothpaste because it did or didn't contain irium — in fact, they didn't buy toothpaste. But today they buy it solely on its advertising claims, without knowing what irium is. To be sure, the science course in college won't provide immediate answers to problems such as these, but it will suggest a general method of getting together the best available information, so that a rational judgment may be possible.

A few weeks ago several ladies representing a temperance organization visited the president of a large chemical company to protest the marketing of a new product, hydroabietyl alcohol, which the company manufactured. To them hydroabietyl alcohol was alcohol, and alcohol was bad. Had the general education of these well-meaning ladies included some science such confusion might have been avoided and their visit would never have been undertaken. During World War II we made 500,000,000 gallons of ethyl alcohol a year. This is the equivalent of two cocktails every day in the year for every man, woman, and chlid in the United States. If drinking in this country has reached such a point, shouldn't we all join the Women's Christian Temperance Union? The difficulty

(*Continued on page 124*)

Early Chinese Rockets

Probably as Early as the Thirteenth Century, but Certainly by the Seventeenth, Chinese Ingenuity Had Adopted Rockets to a Variety of Special Military Uses

By TENNEY L. DAVIS

THE date of the first use of rockets for military purposes is not known with certainty. The Kin Tartars, defending Lo-yang and K'ai-fêng-fu against the Mongols in 1232, are reported to have used "flying fire spears" which by some have been taken for rockets. The Sung historians state that these devices "burnt forward with a sudden flame to a distance of 10 paces and upwards, so that no one durst approach them." Thus, the historical record practically proves that the devices were not rockets at all, for 10 paces is an unreasonably short trajectory for a rocket, more like the distance through which a Roman candle would throw its fire.

The *Wu Pei Chih* (*Treatise on Military Equipment*)[1] by Mao Yüan-i, written about 1621, contains much information about early Chinese military pyrotechnics and many clear, unequivocal pictures, among them pictures of spears equipped with tubes for spouting fire forward in the direction of the spear point, and rocket-propelled arrows capable of flying for 300 or 400 paces. We conclude that the use of rockets at Lo-yang and K'ai-fêng-fu is not proved by the texts which make reference to "flying fire spears."

There are, however, certain evidences which indicate that rockets were probably already known by the middle of the Thirteenth Century. Roger Bacon and Marcus Graecus, both of whom were writing at about this time, describe what appear to be firecrackers and toy rockets, and the title of the latter's *Liber Ignium ad comburendos hostes* (*Book of Fires for Burning the Enemy*) suggests that he considered his contrivances to be adaptable to warlike uses.

In any case, at the time when the *Wu Pei Chih* was printed, the Chinese had already developed great skill in the tactical use of rockets and were far ahead of the Europeans in their military application. Rocket-propelled arrows (Fig. 1) with razor-sharp heads, sometimes poisoned, sometimes carrying incendiary charges, were uniquely qualified for special jobs of offense and defense, for setting fire to enemy installations, for attacks from ambush, for the defense of defiles and gateways.

[1] A considerable amount of material from it has been translated into English by James R. Ware, published with reproductions of 44 of the original pictures, and discussed by Tenney L. Davis and James R. Ware in a paper on "Early Chinese Military Pyrotechnics," *Journal of Chemical Education*, **24**:522–37 (1947).



Fig. 1. Rocket driver tube, shown singly with its central cavity, and shown attached to arrow with the fuse running throughout its length.

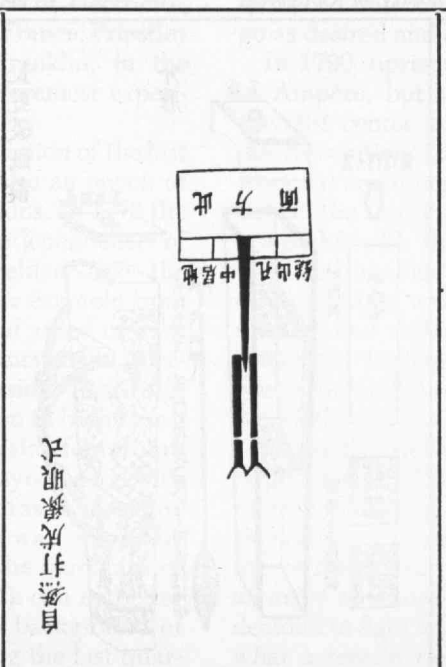


Fig. 2. Tool for making the central cavity in the rocket's propelling charge "does a better job than the drill preferred by the artisans. If the rocket-arrow is to fly straight, the hole must be straight, otherwise it will go off at a tangent."

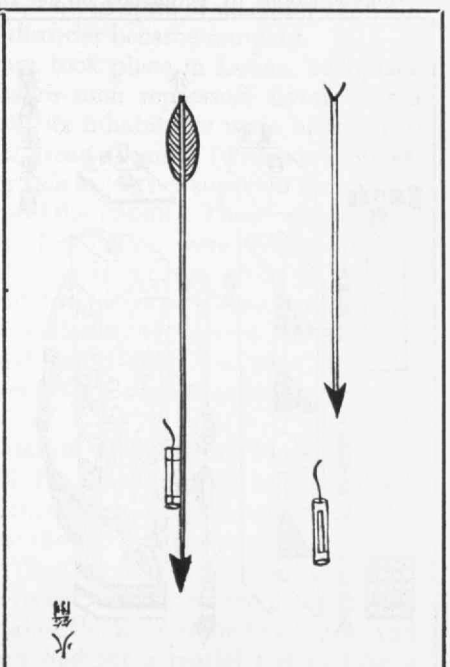


Fig. 3. (Above) *Quiver for carrying several rocket-arrows.*

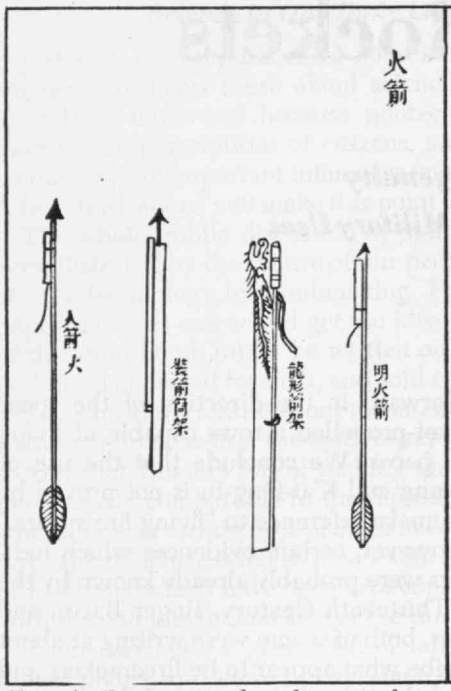


Fig. 4. Devices for launching single rocket-arrows. In one instance the rocket is launched from a tube; in the other, it is fired in the open while the stick is held in position by a loop or ring passed around it.



Fig. 5. Rocket-arrows in tubes, each connected by a fuse (match) to a single master match by which they may be fired simultaneously. The tubes are gathered together into a bundle for firing the cluster.

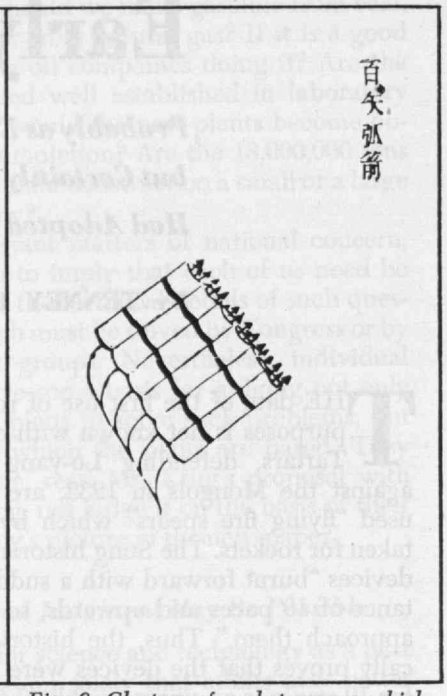


Fig. 6. Clusters of rocket-arrows which are fused for ripple or successive firing. When the master fuse or match is lighted, the arrows in each of the individual clusters fire one another in a successive array.

The *Wu Pei Chih* contains many pictures[2] of rockets for various military purposes, of devices for making them (Fig. 2), carrying them (Fig. 3), and for launching them singly (Fig. 4) and in clusters. Clusters were made up of bundles of tubes, each tube serving to launch one rocket (Fig. 5), or they were made by enclosing many rockets in a single container (Fig. 6) where the sticks were held in position and separated from one another by splints or by passing them through holes in the frames. The driver tubes in back of the heads were counterbalanced by iron weights behind the feathers of the tails.

Incendiary rocket-arrows were fired from baskets made from split bamboo, four feet long, and wider at the open end than at the bottom. The baskets were covered with paper brushed with oil for protection

(*Continued on page 120*)

[2]Reproductions by permission of the Library of Congress.

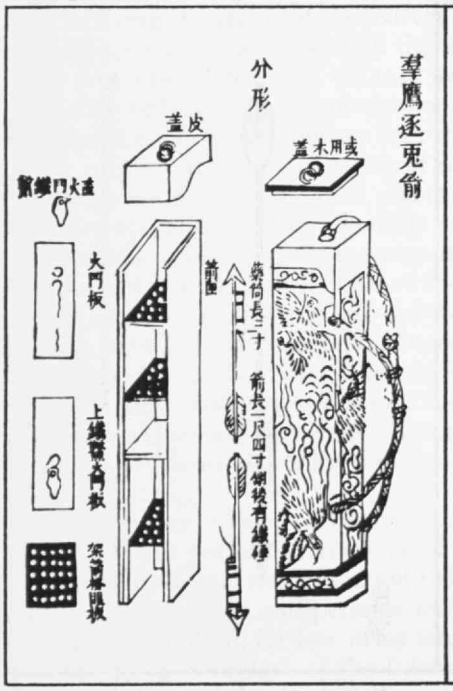


Fig. 7. Portable box of wood or leather containing two sets of 25 rocket-arrows. The sets are arranged to be fired separately, enabling a soldier to meet two emergencies for close fighting.

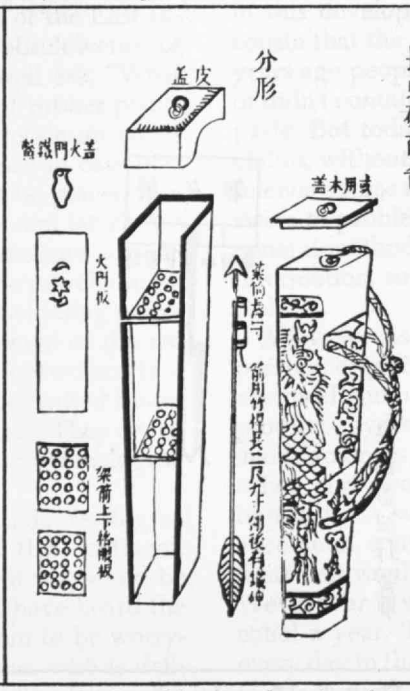


Fig. 8. Portable launcher for firing rocket-arrows against an enemy at 200 paces. Total weight, five or six pounds. The arrows are of bamboo, and points are smeared with poison.

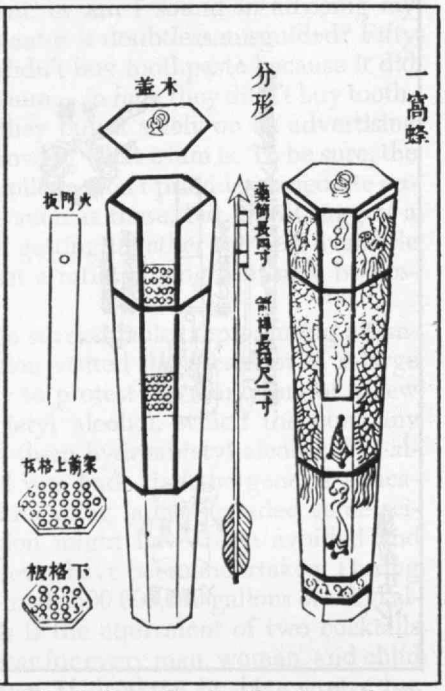


Fig. 9. Launcher for shooting a shower of rocket-arrows to a distance of 400 paces or more. The open end is enlarged so the rocket-arrows will spread out in flight to cover a large area.

André-Marie Ampère—

IMMORTALIZED BY A GERMAN

In Proposing a Name for the Unit of Electric Current Helmholtz Perpetuated the Name of the French Founder of the Science of Electrodynamics

By **DAVID** *and* **CHARLOTTE B. LANDAU**

IN the ancient city of Lyons which, at the time of the Romans was the capital of Gaul, André-Marie Ampère was born 173 years ago. At the time great minds flourished in all domains of learning, but especially in the early development of modern science. On the Continent, and particularly in France, Cauchy, Lagrange, Laplace, Legendre, and Poisson were foremost in the brilliant array of stars in the mathematical firmament. In the physical sciences, Fourier and Carnot in France were laying the foundations for thermodynamics, and Watt in England and Count Rumford in America were making practical applications of new theories of heat. In chemistry, Lavoisier in France discovered a gas, to which he gave the name, oxygen, during his studies of the atmosphere, and Davy in England determined the composition of water by electrolysis. Dalton in England made the first contribution to experimental evidence in support of the atomic theory of the structure of matter, and, in Italy, the laws of gases were being enunciated by Avogadro. In the intriguing and burgeoning science of electricity, Arago, Biot, Coulomb, and Du Fay in France, Priestley and Cavendish in England, and Franklin, in the American colonies, were among the foremost experimental workers of the period.

Paradoxically, the intellectual stimulation of the last half of the Eighteenth Century was also an epoch of political turmoil and national revolutions. In 1775 the American colonists declared their independence of England and gradually became welded into the United States of America. Taking their example from the American colonists whom they had aided in their struggle for freedom, the French commenced to liberate themselves from tyrannical oppression. The struggle for individual freedom was common in both cases; yet it frequently happened, as Lavoisier found out, that the political events of the time played havoc with intellectual advancement. In a less drastic measure, the life and work of Ampère likewise was shaped by events of the era in which he lived. The hardships of his life and the significance of his work can be better understood when presented against a background of conditions and events in France during the last quarter of the Eighteenth Century when Ampère was in the formative years of youth and early manhood.

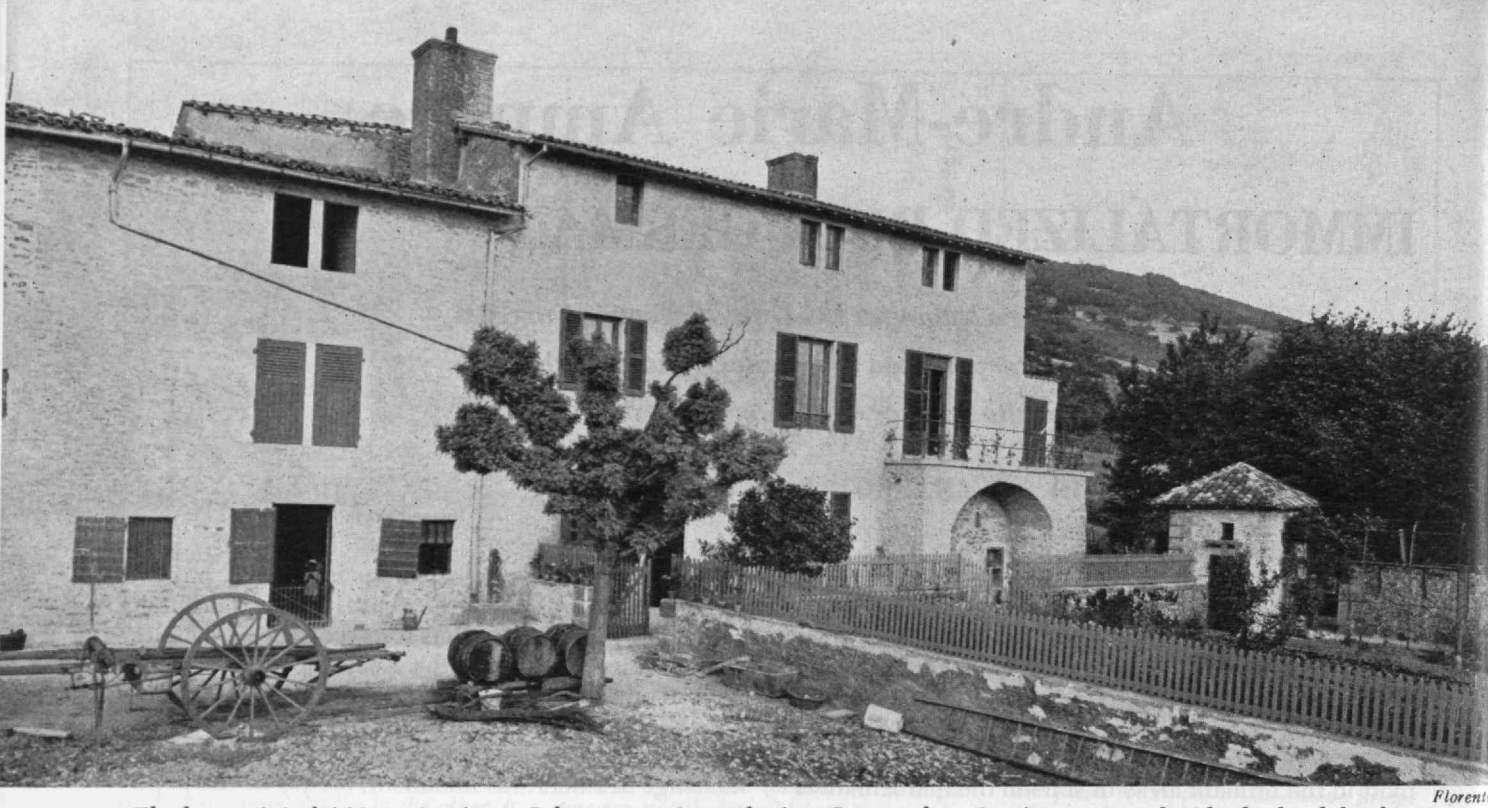
In France the intellectual elite of the Eighteenth Century, like the public, had become disgusted by the corruption of the Court of King Louis XV, and its acolytes. Men of the pen began to knead the public's mind by writing against the abuses and authoritarian principles which their rulers forced on them. Voltaire, Montesquieu, Rousseau, the Encyclopedists and the physiocrats, disciples of Quesnay, all worked to create a public opinion demanding political and economic liberties. Thus, when King Louis XV died in 1774 and a change in rulers was imminent, the joy of the populace was overwhelming.

Louis XVI, a fine hearted, fine minded youth of 20 (who, unfortunately, lacked energy) came to the throne a year before Ampère was born. It was during this King's reign that the Treaty of Versailles was signed in the King's Palace – the Palace of Versailles – in 1783. Benjamin Franklin was one of the negotiators of the Treaty of Versailles, known to Americans as the Treaty of Paris, in which the English Cabinet recognized the sovereignty of the United States, thus ending the American Revolutionary War. The signing of such an important document added luster to the regime of Louis XVI, but, in spite of all, things did not go as desired and disorder became rampant.

In 1790, uprisings took place in Lyons, birthplace of Ampère, but were soon repressed. Lyons was a Royalist center and its inhabitants were opposed to the Revolution. Its great silk mills (with some 30,000 workers) and other rich industries supplied their products to the Court and the nobility. Those who were in sympathy with the Revolution were treated as enemies and handled as such. As they often do in such cases, matters went from bad to worse, and foreign soldiers had to be called in to protect His Majesty. This move hastened his downfall, and soon came the gruesome end: Louis XVI was beheaded on January 21, 1793.

When the Revolution spread from Paris to other large cities in 1793, the inhabitants of Lyons became more daring, and fearing no more the result of their Royalist acts, raised the white flag of revolt on the hilltop of Fourvière. They erected fortifications, formed an army at whose head they placed the *émigrés*, and decided to fight against the Revolution to a finish. And what a terrain they had for a battle! Let us take a glance at the emplacement.

At the time of the Revolution, an old sanctuary stood high above the Saône River. It is now supplanted by the basilica of Notre Dame de Fourvière, whose interior is bedecked with mosaics, oil paintings,



Florent

The home of André-Marie Ampère at Poleymieux a few miles from Lyons, where Ampère spent much of his boyhood, has been reconstructed and made into a museum.

and gold. The view from one of its towers offers a vast and limitless panorama, in the center of which lies the city of many bridges, Lyons. From the bottom of the giant bowl, rise the snowcapped heavenly Alps, while just 100 miles beyond rises the highest mountain of Europe, majestic Mt. Blanc. To the right, more mountains are draped in colors defying description, and to the left may be seen the valleys of the Rhône and Saône, their rivers flowing like a stream of quicksilver in the warm sunlight.

It was in Lyons that Barrère fought the Royalists and said: "The name of Lyons must exist no more. You will call it the Liberated Town, and on the ruins of this infamous city there will be erected a monument which will attest to its crimes and punishments committed against the friends of Liberty. These few words will tell it all; — Lyons warred against Liberty, Lyons is no more."

To realize the above wish, the Committee of Public Safety sent into the unfortunate town three of its representatives who shot or guillotined its inhabitants and destroyed their homes. As is the way of all revolutions, Lyons was turned into a town of horror. Such was the atmosphere in which Ampère spent his youth and early manhood.

Early Life of Ampère

On January 20, 1775, a boy was born in the city of Lyons, France, and two days thereafter was baptized André-Marie Ampère. Until he reached the age of seven, his parent lived in Lyons most of the year, passing the summer months at Poleymieux, a village situated about nine miles north of Lyons, via Saint Didier where his father had a small estate.

Poleymieux, located on the northern flank of the Mont d'Or is surrounded by and blended into a pleasant and colorful country bedecked with numerous white villas. From its heights one can see the graceful Saône River winding in and out as it courses along the valley below. The Ampère house still stands; its terrace planted with the very same linden trees under which Ampère often sat. The view, looking toward the church, is magnificent. It was here, in Poleymieux where André Ampère passed most of his youth.

Ampère's father Jean-Jacques Ampère, was a merchant, a gentleman, a scholar, and a justice of the peace. Upon reaching his 49th year, in 1782, he retired to his estate in Poleymieux. There were no schools in that village so, taking the boy in hand, the father taught him reading and writing in his own language, which he supplemented later by lessons in Latin. In addition to these lessons, André read and even memorized several parts of the *Encyclopedia,* as well as Thomas' *Élogé de Descartes.*

Up to the age of 13, his education was mostly literary to which his father added a variety of other lessons "on many things" during their long walks in the country. In this manner, the diversified knowledge of the young man grew. Ampère tells us that in 1788, the *Elements of Mathematics* of Rivard and Mazéare fell into his hands and all other subjects were forgotten. These works were soon followed by studies of Clairaut's algebra and the treatises on conic sections by La Chapelle and the Marquis de L'Hôpital. André attempted to write a treatise on conic sections for which he believed he had new and original ideas. However, when he tried to read the articles on mathematics in the *Encyclopedia,* he soon discovered that his mathematical knowledge was not sufficiently advanced; he did not know the calculus.

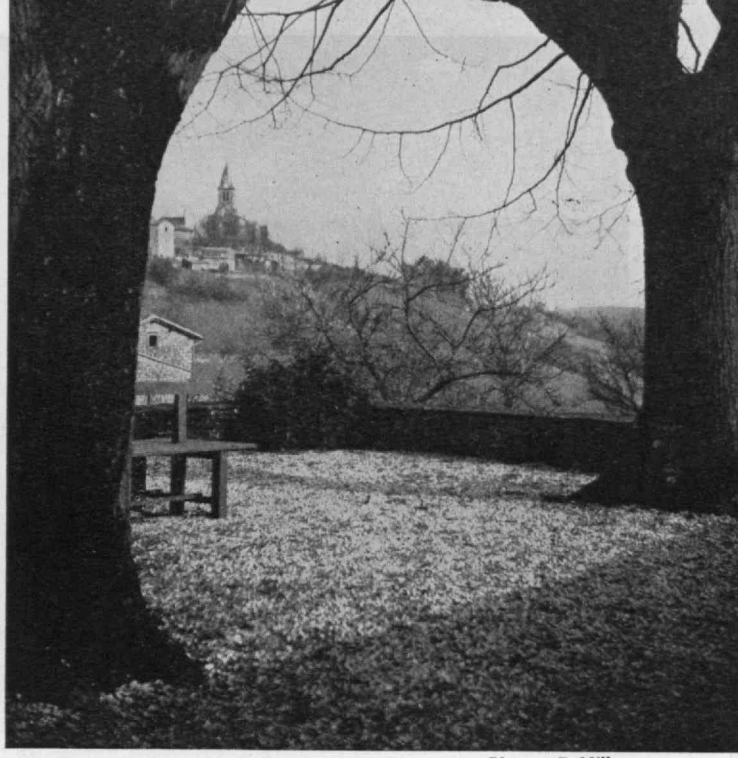
While on a sojourn with his father in Lyons, André made the acquaintance of Abbé Daburon, Professor of Theology at Trinity College of Lyons, who was also

an able mathematician. He told Professor Daburon that he could not make headway in mathematics since he was at a loss to unravel the full meaning of the *d's* in the articles he was reading. This amiable teacher helped him out by giving him lessons in the calculus, thus smoothing the way for further studies. In addition to the work in mathematics, which he carried on under the guidance of Abbé Daburon, Ampère also followed a course in physics by Professor Mollet during the two months that he stayed in Lyons with his father. By the time Ampère reached the age of 18, and without ever having gone to school, he had mastered mathematics and worked through those two monumental pearls – Laplace's *Traité de Mécanique Céleste* and Lagrange's *Mécanique Analytique*. He did not limit himself to mathematics alone. He read everything which came in his hands that instructed the mind. He was a versatile student in Latin which he detested at first; but in due course, it became a part of him and he even composed in it. Horace made a strong appeal to him. To the story of his own love he gave the Latin name of *Amorum*.

The French Revolution was to have a profound influence on the Ampère family. After it had calmed down in Paris, the Revolution spread to the provinces, soon reaching the town of Lyons. In his position as judge, Ampère's father took measures of precaution against the revolutionists and ordered the arrest of their leader, Chalier. This act was to be the cause of his own downfall when the revolutionists became masters of the town. The act of his condemnation, which sent him to the scaffold, read: "Justice of the Peace who issued the warrant for the arrest of Chalier." He was guillotined on November 23, 1793. The news, transmitted shortly after to his son, struck this boy of 18 like a bolt of lightning, incapacitating him for over a year. How much the father thought of the son may be judged from a letter he addressed, in perfect serenity, to his wife the day before the execution; in it we read these prophetic words: "As to my son, I expect everything from him . . ." How right his father was!

A book by Jean Jacques Rousseau, said to have been on botany, but which we believe may have been his *Émilé* fell into Ampère's hands. Its style, charm, and even the theme seemed appropriate for his melancholy needs at this period. This book was perfectly tuned to the surroundings of Poleymieux and with the two elixirs of life – youth and hope – helped to restore André's health. Ampère became fond of botany, and who would not after reading *Émilé*? He devoted himself to outdoor studies and exercises and made long trips to collect specimens for his herbarium.

In September, 1795, at the age of 20, André was working on a universal language. In October he was experimenting with a multiplatform kite on which he intended to place instruments to study atmospheric electricity, air temperatures at high altitudes, and so on. In December he designed an instrument intended to make astronomical observations without having to correct errors due to refraction, and without the use of a clock. Pupil of the school of poverty, he had will power, and by ceaseless effort showed what could be accomplished by willing human hands. He made much of the apparatus needed for his studies. Many



Blanc et DeMilly

In the quiet serenity of this garden in Poleymieux, Ampère pursued his early studies in mathematics and science, thereby laying the foundation for his monumental work in the field of electrodynamics.

pioneers in French science carried on research without endowed laboratories and sometimes even without special tools or instruments except those of their own making. Ampère was one of these versatile pioneers of the Nineteenth Century.

Romantic Years

It was during one of his botanical excursions, on April 10, 1796, that he met Julie Carron, who, on August 6, 1799, three years later, became his wife.

For Ampère it was a case of love at first sight. On August 6, the religious ceremony took place, and on August 7, 1799, "the President of Municipal Administration of Nord, Canton of Lyon, certified having seen appear before him, at the place where the Citizens' Meeting was held, André-Marie Ampère, 'mathematician,' and Catherine Antoinette Carron, who stated to him in firm and intelligible voices that they were freely and voluntarily taking one another in marriage."[1] Ampère was 24 and Julie almost 26.

After their marriage, as well as before, Ampère gave private lessons. So modest was their combined income and trying were their struggles to make ends meet that Julie wrote her mother in her very first letter: "The more I know him, the more do I find him kind and sensible. With a little fortune, everything would go well."

A year after their marriage, on August 12, 1800, a son was born. This blessing threw an extra burden on Ampère's pecuniary needs and forced him to seek a

[1] *"le président de l'Administration municipale du Nord, canton de Lyon, certifiait avoir vu comparaitre devant lui, au lieu de la réunion des citoyens, André-Marie Ampère, 'mathématicien,' et Catherine Antoinette Carron* (this was her real and official name), *lesquels lui ont déclaré à haute et intelligible voix se prendre librement et volontairement pour époux."*



The Ampère home has now become a museum where visitors may see the personal and scientific effects of André-Marie Ampère, his father, and his son.

Société des Amis d'André-Marie Ampère

more lucrative source of income. Prior to his marriage, Julie's relatives had suggested that André become a business man, but this was far from Ampère's desire to become a teacher. Teaching was in the blood. Now came the ill health of his wife, and that obliged him to carry on still more work.

On February 19, 1802, he obtained a chair of physics and chemistry at the École Centrale of Bourg-en-Bresse, in the department of Ain. This school, at Bourg-en-Bresse, had a long and famous history dating back to 1391! It went through many changes and enlargements. In 1661, a chair of philosophy was founded there, and in 1744 it became the center of intellectual life inspired by the famous astronomer, Joseph Jérôme Lalande, who was born in Bourg. In 1793 the college was closed, but later it was reopened under the name of École Centrale, which was again changed, in 1805, when the school became the Lycée Lalande. Ampère was a professor at the École Centrale from April, 1802, to 1803. He was forced to live in Bourg which was but 60 kilometers from Lyons. In Ampère's day, it required one and a half days to make the trip; today it takes about one and a half hours. Here, in his own words, he tells us by a letter which he sent his wife, how he lived in Bourg:

I am boarding for 40 francs per month at Beauregard's. They charged me 60 francs at the inn, where I had to dine in the company of the biggest fools I have seen in my life. That surpasses all possible description . . . I saw the physics room, the chemistry laboratory and the single small room with an alcove, catch-all serving as a small woodshed. I was very pleased with the machinery; the laboratory is equipped with a large exhaust-hood, vented into the fireplace, designed to vent off noxious gases; there are plenty of facilities for various experiments . . . address your letters to Citizen Beauregard . . .[2]

[2] *"Je suis en pension à 40 francs par mois chez Beauregard. On me demandait 60 francs à l'auberge, où il fallait manger avec les plus sottisiers que j'aie vus de ma vie. Cela passait toute expression. . . . J'ai vu le cabinet de physique, le laboratoire de chimie et l'unique petite chambre avec alcove, petit débarras a mettre le bois. J'ai été fort content des machines; le laboratoire a un grand manteau de cheminée par où doivent s'exhaler les vapeurs nuisibles; il y a assez de ressources pour les differentes expériences . . . adresse tes lettres au citoyen Beauregard. . . ."*

[3] *"De Mme. Julie Ampère au Citoyen Ampère, chez le Citoyen Beauregard, professeur d'Histoire à l'École Centrale du département de l'Ain, à Bourg, pres de l'Église Notre Dame."*

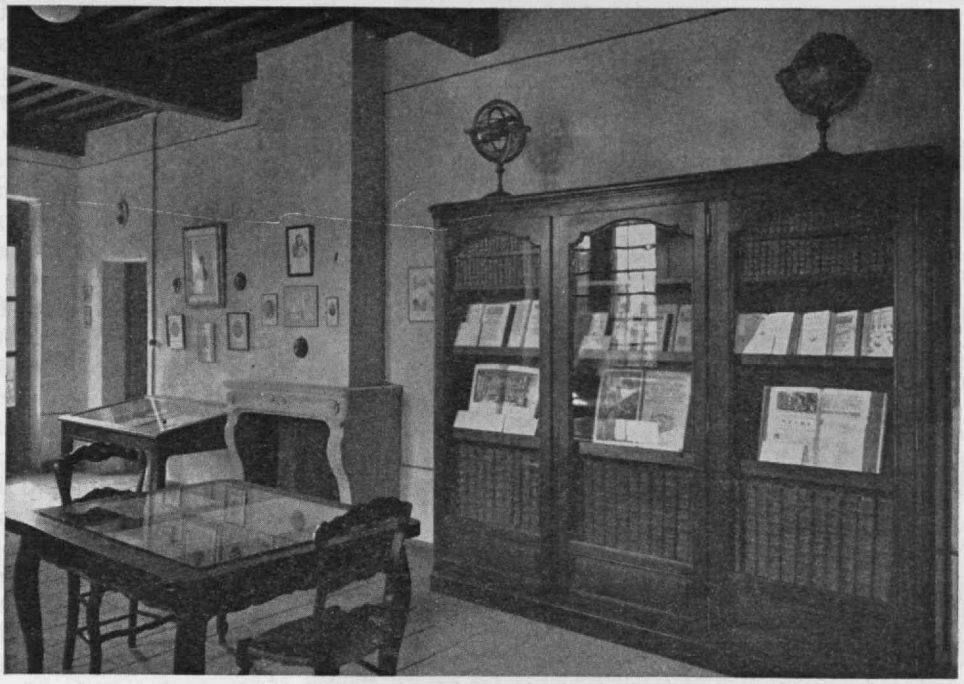
[4] *". . . prenons patience et réjouissons nous de pouvoir parler à Paques de tout ce que nous avons dans l'âme . . . mon pauvre Ampère, tu es trop content de m'envoyer tout ce que tu gagnes. . . ."*

And Julie addressed letters to him in the following manner:

From Madame Julie Ampère to Citizen Ampère, lodged at Citizen Beauregard's, Professor of History at the École Centrale du departement de l'Ain at Bourg, near the Notre Dame church.[3]

What a document on an envelope! Ampére sent practically all his earnings to his wife; such was the soul of the great man who was as poor as the proverbial church mouse. He wrote her of his daily tasks which lasted from 12 to 13 hours in the school! Julie, in turn, consoled him with her little words of kindness. Here is one of them: ". . . let us be patient and let us rejoice that we will be able to speak at Easter about everything we have in our souls . . . My poor Ampère you are just far too pleased to send me everything you earn . . ."[4] In another one of her letters she wrote: "Look out for your chemistry. Your blue stockings are destroyed with that frightful acid which burns everything." Poor Julie! Like other daughters of France, with limited income, in ill health, and with a small child to care for, she probably darned many a blue stocking.

Ampère wanted to be near his family and decided to become a professor in his own town of Lyons. How could he make this want known to the authorities? With a professorship as a goal he decided to write a treatise of some kind that would attract attention of the academic public. For some time Ampère had drawn the attention of the scientific world by his purely mathematical work and so deep was he intrenched in that science that, even his wooing was, at



Ampère's library is kept much as it was more than a century ago when he was professor of physics at L'École Centrale in Bourg-en-Bresse.

Société des Amis d'André-Marie Ampère

times, a little mathematical. He tried to teach Julie Carron how to calculate the height of a village steeple, and history tells us he met with success!

In 1802, he wrote a memoir which he called *Considérations sur la théorie mathématique du jeu.* Following in the steps of Pascal and Fermat, this paper dealt with the mathematical theory of gambling and was presented to the Institut by Delambre on January 12, 1803. "The players," said Ampère, "see only the effects of chance in these events which are most apt to teach them the extent of the dangers into which they throw themselves. These events might make a deeper impression on their minds if one could demonstrate that they are facing a combination of good and bad chances, and the only way to escape the misfortune is to cease exposing themselves to it." He gave such a learned proof of his theoretical reasoning that it could be understood only by an able mathematician. His memoir which should have been finished in "a day or two" took 10 months to be completed! It was examined by several persons, including Lalande, but none could understand it. Lalande was already too old and lost his ideas of analytics and its application to probabilities. But he said in a short report: "Citizen Ampère possesses rare knowledge and marked talent." Finally, Laplace examined it at the request of the Institut. He found an error which Ampère corrected. Ampère then submitted it to the one man who could understand it – Delambre – who had been one time a pupil of Lalande.

Delambre was so impressed by Ampère's work that he persuaded Bonaparte, who was then first consul, to name Ampère professor of mathematics at the Lycée of Lyons in 1803. He was appointed to the post and taught for a short time in that gruesome cloister which was to bear his name later. Thanks to this appointment, he was now able to join his family, although his happiness was short-lived. Julie, who had been ailing for some time, now grew worse, and died on July 13, 1803, The shock of her death overwhelmed Ampère and life became dismal without his companion. Ampère became a broken man and decided to leave his beloved Lyons.

In October, 1804, at the age of 30, he was appointed to the newly established École Polytechnique in Paris as *répétiteur d'analyse* or assistant in calculus. In March, 1806, he was named member of the *Bureau Consultatif des Arts et Métiers,* and in 1807, became *professeur suppléant d'analyse* or substitute professor of calculus. In 1808, he was named entrance examiner and *inspecteur général de l'Université,* and in 1814 he was elected a *membre de l'Institut.* Membership in the French Academy, which is a part of the Institut and which Henry Crew[5] describes as "a coterie of productive scholars perhaps never surpassed either before or after," was a coveted honor which Ampère well deserved. In the same year he was also made a *Chevalier de la Légion d'Honneur,* while 1816 brought him the full title of professor of calculus and mechanics at the École Polytechnique. It was in this school that Ampère performed his famous experiments in electrodynamics. Finally, in 1824, he was elected to the chair of physics at the *Collège de France,* which high post he held to the end of life.

Ampère was a man of science but he was also intermittently at least, a man of religious faith. "Doubt," he once said, "is the greatest torture Man can endure on Earth."[6]

He had been a sufferer of rheumatism for many years, and at 50 he developed a chronic affection of the chest, but frequent visits which he made to the Mediterranean usually helped to restore his health. In 1829 he began to ail seriously and was replaced in his teaching at the *Collège de France* by Savart for one year. He returned but had to give up again and was replaced by Savart and Becquerel in 1832–1833. In

[5] "Portraits of Famous Physicists with Biographical Accounts," *Scripta Mathematica* (New York: Yeshiva College, 1942).

[6] When he was at Bourg he asked his wife to send him certain religious books and he went to church often. His mother was very pious.



J. Linton Houser

The plaque and inscription above, in the railroad station at Ampere, N.J., remind American commuters of their debt to the brilliant intellect whose treatise on electrodynamics, as presented before the French Academy, was developed in the remarkably short period of about two months.

May, 1836, during a journey of inspection to Marseilles he was seized with illness and died there on June 11, 1836. He was in his sixty-second year. His remains were transferred to the cemetery of Montmartre in the city of Paris in 1869.

It is, perhaps, difficult to evaluate the life of such an outstanding intellect as Ampère in the light of our present, and detached, point of view. And yet how little difference two centuries make in human nature!

In the words of Rollo Appleyard, Ampère may be quite properly described as one given to "plain living and high thinking." Ampère was financially a poor man, yet he bore honors and titles bestowed only upon the highest of intellectuals of France. And what a galaxy of titles Ampère had earned: *Membre de l'Institut, Professeur de l'École Polytechnique,* and *Inspecteur Général de l'Université* among them. But for all his intellectual attainments and honors, Ampère was hampered in his research – as indeed also in his private life – by the small income which he received. With all his titles, Ampère was so reduced in his finances that he had to supplement his income by private teaching. Even such additional effort was not sufficient to fulfill the needs of Ampère who lived simply all his life and kept expenses to a minimum. It is recorded, for example, that Ampère once borrowed 50 francs from Fresnel to pay part of his household expenses. In 1824, his sister Josephine (who kept watch of his budget to free Ampère from household worries) admitted a debt of 11,000 francs which she had contracted during the previous five years. Most of this amount had been spent for instruments needed in scientific experiments, but the indebtedness had been kept from Ampère.

In personal demeanor, the modest Ampère was indifferent to fame. This is shown by the fact that he wrote and published a work on the differential and integral calculus to which he did not even attach his name. May we not be justified in believing that perhaps Ampère wished to make available to others the knowledge of calculus which he, in turn, had received through the kindness of Abbé Daburon?

As for his scientific work, Ampère was so advanced that contemporary French physicists were prone to criticize him, even suggesting that his theories were not in accord with Newton's laws. Of the elite members of the French Academy, Fourier alone received Ampère's theories favorably. In England few men understood his theories and still fewer his analytical work. Yet, a quarter century after Ampère had so brilliantly established the field of electrodynamics, Maxwell, in England, summarized the work of Ampère into the circuital law of Ampère – one of the four foundations of modern electromagnetic theory.

Ampère's mind seemed to know no bounds, and, as might be expected, he made contributions to many sciences. He contributed to the initial idea of the electric telegraph by directing attention to an idea suggested by Laplace that it might be possible to cause a magnetic needle to deflect at great distances by means of an electric current. He also came near to being the discoverer of iodine. His memoirs show his work covered such subjects as transcendental mathematics, Mariotte's law, electricity, magnetism, optics, molecular physics, animal physiology, psychology, theory of gases,[7] mechanics, theory of terrestrial magnetism,

(*Continued on page 126*)

[7] Ampère's law was formulated independently in 1814, although Avogadro's law had been announced in 1811.

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

For the Record

BUSINESS was the order of the day at the 264th meeting of the Alumni Council held at the Campus Room of the Graduate House on October 25, with C. George Dandrow, '22, President of the M.I.T. Alumni Association, presiding. At this meeting, which opened the season's activities, 129 members and guests were present.

Reports by committees on resolutions for the late Professors C. Frank Allen, '72, Class Representative on the Council, and Charles E. Locke, '96, Secretary of the Alumni Association, were presented by Professor Erwin H. Schell, '12, and Dr. John A. Rockwell, '96, respectively. The resolutions were adopted by a standing vote in tribute to these two outstanding Technology Alumni.

The resolution on Professor Locke, prepared by the committee under the chairmanship of Dr. Rockwell, read, in part: "As a teacher and member of the Institute's staff for forty years, he will long be remembered by associates and students alike for his thoroughness and sense of responsibility in the handling of all tasks. As a mining engineer and author, he was well known and highly regarded for his many contributions in methods of processing ores. As Secretary of the Alumni Association from 1930 to 1948, and particularly as Secretary of the Council, he has earned the gratitude and appreciation of each and every member by conducting his work faithfully, efficiently and pleasantly. As Secretary of the Class of 1896 from 1908 to 1948, he was known and loved by all."

H. E. Lobdell, '17, reporting for the Executive Committee, announced that Donald P. Severance, '38, associated with the Office of the Registrar since his graduation from M.I.T., and Assistant Registrar since 1941, had been elected secretary of the Alumni Association to fill the unexpired term of the late Professor Locke. Mr. Severance was simultaneously elected treasurer of the Association to succeed Ralph T. Jope, '28, who had resigned to accept the assignment of assistant executive director of the Corporation Committee on Financing Development, as recorded in greater detail on page 110 of this issue.

Edmund B. Fritz, '32, was reported to have been appointed chairman of Alumni Day, to be held on June 11, 1949. It was also reported by Mr. Lobdell that the Midwinter Meeting of the Alumni Association would be held at Walker Memorial on February 5, 1949. The chairman for this meeting will be George E. Shrigley, '30. Also reported were visits by 21 Faculty members and alumni members to 14 M.I.T. clubs between the dates of June 1 and October 25. Henry B. Kane, '24, Director of the Alumni Fund, reported that 8,000 Alumni had contributed $117,000 to the Fund as of October 25.

Dr. Compton addressed the Council in his new role as chairman of the Corporation, dealing with those events which led to the establishment of the Institute, the recent appointment of himself as chairman of the Corporation and James R. Killian, Jr., '26, as his successor to the presidency of M.I.T., and speaking briefly on the Institute's Financing Development Program now getting under way.

Professor William L. Campbell, '15, who has taken on additional duties as executive director of the Corporation Committee on Financing Development, presented a résumé of the committee's program and goal, a brief outline of the various subcommittees already at work, and an indication of the activity already under way in this far-reaching program.



M.I.T. Photo

DONALD P. SEVERANCE, '38

Secretary-Treasurer of the Alumni Association

In his recent election as secretary-treasurer of the M.I.T. Alumni Association, Mr. Severance succeeds the late Charles E. Locke, '96, who served as secretary from 1930 until his death last September; he also succeeds Ralph T. Jope, '28, who has been treasurer of the Alumni Association from 1939 until his resignation from this position last month to devote a major portion of his time to the Financing Development Program as its assistant executive director.

Mr. Severance is a graduate of the Course in Electrical Engineering, having received his bachelor's degree in 1938 and his master's degree in 1941. He has taught courses in Electrical Engineering, and since his graduation a decade ago Mr. Severance has been associated with the Registrar's Office. He leaves his position as assistant registrar to devote full time to the rapidly expanding activities of M.I.T. clubs, now numbering 85, and to the Institute's alumni body.



M.I.T. Photo

RALPH T. JOPE, '28
Assistant Executive Director



M.I.T. Photo

WILLIAM L. CAMPBELL, '15
Executive Director

Actively participating in the administration of the Institute's Financing Development Program, which was officially launched at a meeting at Technology on November 19–20, are the two M.I.T. Alumni shown above. In addition to his duties as head of the Department of Food Technology, Professor Campbell has been appointed executive director for the Program whose objective is to raise $20,000,000 for new construction, additional endowment, and unrestricted funds for the Institute.

Mr. Jope's new position as assistant executive director for the Financial Development Program has made it necessary for him to relinquish his position as treasurer of the M.I.T. Alumni Association, a post which he has filled with distinction since 1939. This advancement will result in no changes in the personnel of this periodical, for Mr. Jope continues to serve The Review as its business manager, as he has done for the past two decades.

As chairman of the Committee on Alumni Participation in the Financing Development Program, H. B. Richmond, '14, explained the relationship of the Alumni Fund to the new Financing Development Program. It was pointed out that the $500,000 contribution of Alumni for the completion of the new Senior House was already one way in which the Fund had aided the Financing Development Program, and that the Alumni Fund would be exceedingly helpful in achieving the objectives of the Program.

Mr. Dandrow then introduced Dr. Killian for his first appearance before the Council in his new role as president of M.I.T. Dr. Killian paid tribute to his predecessor and commented on his rise from student editor to his present post. He recounted some recent developments of the Institute by enumerating the activities and problems of four offices of administration: Admissions, Registrar's, Treasurer's, and Dean of Students.

Financing the Development Program

NEARLY 200 Alumni and friends of the Institute gathered in Cambridge on November 19 and 20 for a two-day conference to study the Institute's postwar problems and to lay plans for the formation of an organization to secure for M.I.T. its high priority postwar needs in buildings and endowment.

For more than a year the Institute's increasingly difficult postwar task of carrying a major responsibility for training many of the nation's scientists and engineers, and conducting numerous significant research programs, had been under study by the Corporation's Survey Committee, headed by John R. Macomber, '97. This committee concluded that, to maintain its foremost position among the privately endowed institutions of higher learning, the Institute would require considerable expansion of its facilities and endowment; it also recommended that a Committee on Financing Development be established to secure the funds required for underwriting the Institute's future needs. The meeting held in Cambridge was the first step in carrying out the recommendations of the Survey Committee.

The conference was officially opened by Marshall B. Dalton, '15, general chairman of the Committee on Financing Development, at a luncheon in the Campus Room of the Graduate House on November 19. He outlined the purpose and program of the conference and introduced the Institute's new President, James R. Killian, Jr., '26, who discussed the nation's need for maintaining the independence and integrity of institutions of learning.

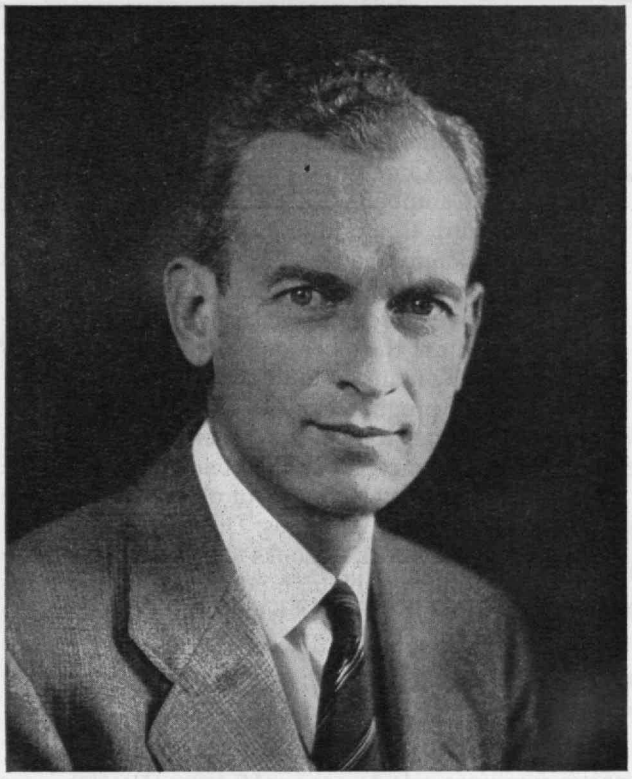
In summarizing the reasons why the Institute needs large capital funds, President Killian pointed out that, fundamentally, the Institute's problem is to fund its

independence. It is especially important to make sure that the Institute has sufficient resources so that it is not required to look to government subsidy for conduct of its outstanding services. In outlining the basic needs of the Institute, he pointed out that the principal goals of the Institute were as follows: (1) M.I.T. must maintain its educational leadership by pioneering work in new fields and by having unexcelled facilities; (2) the Institute must broaden its educational program by providing a more rounded and complete college community for its students, almost a third of whom are pursuing graduate study, and (3) it must insure and stabilize an adequate salary level for its Faculty and staff to assure a stable corps of instructors of the highest caliber that can be obtained.

The afternoon session, also held in the Campus Room, was devoted to a detailed presentation of the needs of the Institute as set forth by the Survey Committee and amplified by members of the Administration. Everett M. Baker, Dean of Students, stressed the importance to high student morale of a pleasant living environment, and forecast the benefits to be expected from better housing and recreational facilities for the students and younger members of the Institute's growing staff. Professor John C. Slater, Head of the Department of Physics, spoke of the dire need for moving the important research and educational programs in nuclear science and in electronics out of the present wooden structures and into a modern fireproof laboratory. Professor Thomas K. Sherwood, '24, Dean of Engineering, described the work going on in the fields of gas turbines, supersonics, hydromechanics, and metal processing, and made special reference to the need for new laboratories for the programs in hydromechanics and metal processing.

Another area of research being carried out in nonfireproof quarters, improvised during World War II, is in the important field of food biology and processing. Professor William L. Campbell, '15, Head of the Department of Food Technology, outlined the needs of his Department in the Institute's program of food research and instruction. As spokesman for the nonscientific needs of the Institute, Professor John E. Burchard, '23, Dean of Humanities, made a strong case for the need of a Humanities Center as part of the new Hayden Memorial Library now under construction; an auditorium for student gatherings, and a Faculty Club were also listed as immediate nonscientific needs of the Institute. Finally, Horace S. Ford, Treasurer, closed the Friday afternoon meeting with an address on the financial problems confronting M.I.T. as it faces the future, and discussed the way in which these could be solved with added endowment and unrestricted funds. The Institute's postwar needs were estimated at $30,000,000 of which approximately $10,000,000 has been received since World War II in gifts, leaving a balance of $20,000,000 to be raised for new construction, additional endowment and unrestricted funds for M.I.T.

On the evening of November 19, the Hotel Statler was the scene of the banquet for those attending the conference. Speakers included Alfred P. Sloan, Jr., '95, honorary chairman of the Committee on Financing Development, and Dr. Compton, chairman of the Corporation.



DONALD F. CARPENTER, '22
Life Member of the Corporation

Corporation Life Member Donald F. Carpenter, '22, chairman of the United States Munitions Board, has been elected to life membership on the Corporation of the Institute. Mr. Carpenter was first elected to the Corporation for a five-year term in 1943. His election to life membership comes at the completion of this term, during which he has served as chairman of the Corporation Committee on Student Activity. Associated with the Remington Arms Company since 1933, where he is now vice-president and assistant general manager, Mr. Carpenter is in Washington on leave of absence. Mr. Carpenter has served on the Industry Advisory Committee and more recently on the Military Liaison Committee of the Atomic Energy Commission. He is also deputy to James Forrestal, Secretary of Defense, on atomic energy matters. He is a member of the Board of Directors of the American Management Association and is assistant chairman of the Small Arms Ammunition Industry Integrating Committee. Mr. Carpenter is a director of the Merchants National Bank of Leominster, Mass., the Remington Arms Union Metallic Cartridge Company, Ltd., of Brimsdown, England, the Peoples Savings Bank of Bridgeport, Conn., and the Seneca Falls (N.Y.) Machine Company.

On Saturday, the conference discussed ways and means of underwriting Technology's future. As guests of the committee, Arnaud C. Marts, President of Marts and Lundy, Inc., New York consultants in fund raising, outlined the policies and methods which have been found to be successful in securing capital funds for universities. He reinforced the confidence of members of the Survey Committee that the $20,000,000 still needed is within the likelihood of attainment in a period of about two years. At the same time, he warned that funds on such a scale as those needed by the Institute require long and painstaking efforts.

Joseph J. Snyder, 2–44, Assistant Treasurer, indicated what may be expected in the way of Corporation participation in the capital funds program. Mr. Dalton then introduced the chairmen of the various subcommittees who spoke briefly on their respective

functions in the campaign. The committee chairmen include: Alfred P. Sloan, Jr., '95, honorary chairman, and Marshall B. Dalton, '15, general chairman, Committee on Financing Development; Thomas D'A. Brophy, '16, Committee on Public Information; H. B. Richmond, '14, Committee on Alumni Participation; William L. Campbell, '15, Committee on Projects; Horace S. Ford, Committee on Resources; Frank B. Jewett, '03, Committee on Foundations; and Phillips Ketchum, Committee on Bequests. Professor Campbell is executive director and Mr. Jope is assistant executive director of the office staff having headquarters in the Institute's main buildings.

The two-day program came to a close with a luncheon in the Campus Room. Professor George R. Harrison, Dean of Science, made the concluding luncheon talk. Claiming a certain degree of objectivity because he was not an M.I.T. Alumnus, Dean Harrison chose for his topic "How M.I.T. Looks to an Outsider on the Inside" in appraising the high potentialities of the Institute and the critical part which the Development Program will play in M.I.T.'s service to society in the postwar era.

The President Reports

GRANTS from industry in support of research and advanced education at the Institute are increasing under a program in which the possibilities of cooperation with industry in fields of mutual interest are being explored. This trend was reported by Dr. Compton, as President of M.I.T., at the meeting of the Corporation on October 4. In recording progress toward objectives for the future development of the Institute, Dr. Compton recalled the work of the Corporation's Survey Committee, headed by John R. Macomber, '97, and outlined the steps which are being taken to implement that report. Said Dr. Compton:

The Survey Committee was a large and representative group of the Corporation, aided by several alumni and outside consultants. It made a thorough study of the financial resources of the Institute and of the administration's tentative list of high priority needs for additional capital facilities and resources, and it recommended the creation of a Committee on Financing Development with a "program to increase the endowment and plant of M.I.T. [which] should be a planned, scheduled and organized effort to bring the Institute to maximum effectiveness. The short-range objective is to secure [an additional] $20,000,000 over a reasonable period for immediate application to the several projects and endowment but the Committee on Financing Development should also arrange for a continuous directed effort to finance new or changed requirements as they arise in the future."

The Survey Committee then went on to suggest a proposed organization for securing these funds, as a result of its study of various tested plans and methods. It recommended a large standing committee, reporting to the Corporation, to be called the "Committee on Financing Development." It recommended the appointment of a General Chairman, a Steering Committee, a Development Office, a Committee on Projects, a Committee on Public Information, a Committee on Alumni Participation, a Committee on Resources, a Committee for Special Gifts, a Committee on Business Corporations, and a group of local committees. It also suggested the form and duties of these committees and considered the desirability of engaging the assistance of a professional fund-raising organization. The Committee's report closed with the following paragraph:

"The Survey Committee approves in principle the broad organizational outline as described here, recognizing that the complete organization will need to be devised later. This outline is intended to serve only as a preliminary guide to the chief executive of the organization. Carefully detailed preparation and organization should precede the opening of active solicitation. While the immediate effort will not be a 'campaign' or a 'drive' the organization needs to operate with a sense of urgency, and with effective publicity. All members of the M.I.T. constituency should be given an organized opportunity to contribute, even though the primary source of funds will be found in a limited number of donors." In interpreting this last sentence, we expect that this financial operation will stimulate rather than compete with contributions to the alumni and class funds within the normal scope of these funds.

Following the Corporation's approval of the recommendations in this report, the Executive Committee moved promptly to start the operation. Its first and most important move was to select the General Chairman, and the immediate approval of the selection of Marshall B. Dalton, '15, has been well justified by the vigor with which he is undertaking the organizational steps.*

There are a few general comments which I would make with reference to our fund-raising program. The first is that we are talking about postwar additions involving $30,000,000, of which approximately $10,000,000 has already been secured, leaving $20,000,000 still needed. So far as we can ascertain, this is the largest amount of money which any educational institution, with the exception of one, has ever set out to raise in an organized intensive effort, though it is far from the largest amount of money which institutions have stated to describe their needs and opportunities.

The second point is that every one of the objectives listed has been checked and studied in detail and stands every test which we can give it as being essential to our position of leadership in technological education.

The third comment bears on a rather anomalous situation in which privately supported educational institutions are found in one particular aspect of fund raising. I refer to the general attitude of the philanthropic foundations. There was a time a score or two score years ago when the foundations gave generously to the creation of needed new facilities of laboratories, libraries, and the like. Then came a reaction against "brick and mortar" and emphasis was placed on support of projects and programs, with emphasis shifting from endowment or long-term support to short-term support and with the formula that "if the project proves to be good, some other means will surely be found to continue it." Simultaneously emphasis was coming to be placed on men, rather than on either projects or facilities.

In commenting on the problems of financing which privately endowed and publicly supported educational institutions face, Dr. Compton recalled that private institutions are being more and more throttled in their efforts to obtain plant facilities and "this particular situation is one which threatens the relative effectiveness of privately supported institutions." Then, continued Dr. Compton:

Government has not found a legitimate way to provide private institutions with new capital facilities, except in certain very special cases, and industry is just beginning to justify grants for capital purposes. Foundations them-

(*Continued on page 114*)

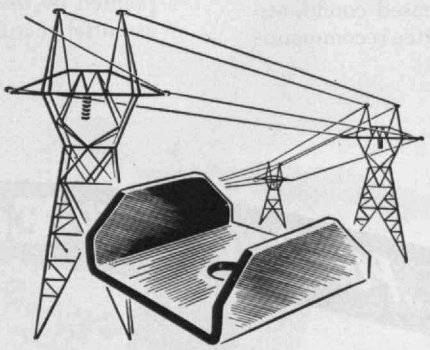
*Progress being made by the Committee on Financing Development appears on page 110.

BUSINESS IN MOTION

To our Colleagues in American Business . . .

The part shown here certainly does not seem complicated in either design or manufacture. Yet actually it proved to be difficult to make as economically as was desired. The piece is called a "potential tap," and is a small stamped channel section used in certain types of electric meters. Since it has to carry current, naturally it is made of copper.

Originally this was made of electrolytic copper, with sufficient hardness to provide the strength required to withstand the operation of tightening the wires on it by means of a nut and washer. The metal, however, proved troublesome, because cracks developed at the bends during the forming operation. As a result, 100% inspection was required, and rejections were numerous. Even though the rejects had a high salvage value, as is the case with anything made of copper, still the cost of the part was much higher than had been expected.



At this point, a Revere Technical Adviser entered the picture. He studied both the requirements of the metal and the fabrication methods, and made two suggestions. One was that a somewhat harder temper be used. The other was that the metal be OFHC Copper, Oxygen-Free, High Conductivity. Test runs on this Revere Metal proved so satisfactory that a large production order was placed.

OFHC Copper carries a premium over regular electrolytic, due to the extra processing necessary to produce it. Most of its applications are rather special, such as in electron tubes, and in electrical equipment operated at high temperatures in the presence of reducing gases. In the case of this potential tap such chemical characteristics were unimportant. The reason the Revere Technical Adviser recommended the metal was that it has excellent forming characteristics, even at a Rockwell hardness of B50. For that reason it can be deep-drawn, and the 90-degree bend required in this part is easy to produce without fracture.

The General Manager of the company expressed it this way: "We paid a premium for OFHC Copper. But that premium is much more than offset by our saving in scrap and the all-around reduction in costs. Our potential taps now have no more cracks in the bends, there are no rejections whatever, and expensive inspection has been eliminated."

Thus another manufacturer has learned that it is not the price per pound that determines the economy of a material, but the cost of the finished part made of it.

In this instance Revere collaborated with the company in the investigation. However, there are other informed suppliers of materials, whether they be metals or chemicals, plastics, glass or wood. Revere suggests that you take them into your confidence, and work closely with them. After all, every order entitles you to their knowledge as well as to their shipments. Why not get both?

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THE INSTITUTE GAZETTE

(*Continued from page 112*)

selves have as great a stake as anyone in the prosperous development of industry, for they are among the largest stockholders in free enterprise. In regard to major social problems – like natural resources versus population, national security, ability to maintain social security and standards of living and health – science and technology play roles certainly comparable to social planning or controls in any long-range view, and are clearly subordinate in importance only to ethics and religion.

Although Cambridge and M.I.T. are almost synonymous terms, the President's Report reminds us that the Institute has outside operations going on in 27 places in 11 states and in Canada. The President's Report included the following comments on special educational projects:

I had originally hoped to discuss at this time the report of our faculty committee on its two years' intensive study of our educational objectives and procedures. However, because of the magnitude and importance of the task, the decision was reached to postpone the report until some time in the coming year, it being felt that soundness of conclusions was far more important than a few months more or less in their timing. When this study shall have been completed we shall all feel an increased confidence and enthusiasm, whether or not the committee recommends substantial changes in our operations.

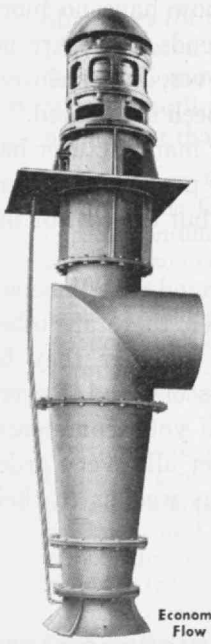
With renewed generous financial support by Alfred P. Sloan, Jr., '95, through his foundation, the Alfred P. Sloan Foundation Fellowship Program in industrial management has been reauthorized for a period of years, after having been abandoned during the war because the men who would have been involved in it were too urgently needed for war service. We are convinced, by testimony and results, that this has been the outstanding program in the country for expediting the development of promising young executives. A group of fellows will be selected during the coming months to begin their active program next summer, under the executive supervision of Professor Gerald B. Tallman. In conducting this program, our Department of Business and Engineering Administration has always had the very generous co-operation of the top executives of many business concerns in the selection of candidates and participation in seminars, plant visits, and thesis studies.

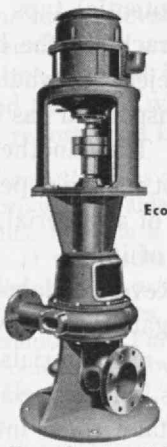
The unique program of the M.I.T. Foreign Student Summer Project was also summarized in the President's Report; a full-length article on this topic appared in the November, 1948, issue of The Review. As to athletic activities at M.I.T., the President's Report continues:

Also of real educational significance is the new program of intramural and undergraduate athletics which has been instituted under the regime of our first Director of Athletics, Ivan J. Geiger, and the new Athletic Board appointed by the President. With retention as before of the essential feature of undergraduate management of their

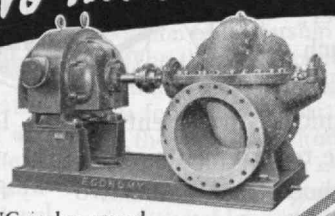
(*Continued on page 116*)

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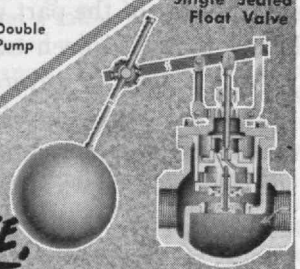
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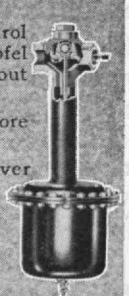


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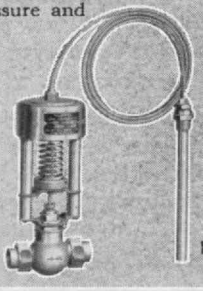
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THE INSTITUTE GAZETTE

(*Continued from page 114*)

activities, but with the experience and advice of Mr. Geiger, emphasis has been placed on two factors: first, the attempt to interest every student in some type of athletics, and, second, substitution for the prewar freshman compulsory physical training of a program whereby every freshman, under experienced teachers, achieves some proficiency in one or more types of athletic sport which can give him continued satisfaction after leaving college. The results of the first year of this new program have been decidedly gratifying.

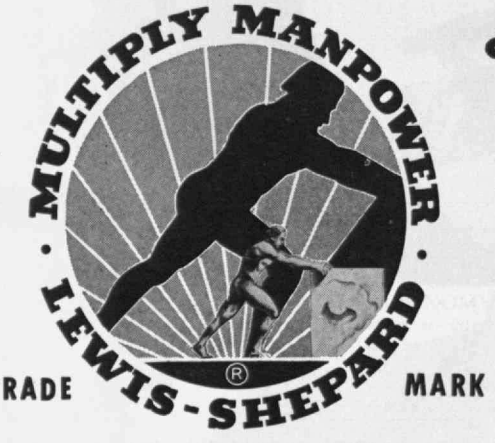
In spite of efforts to reduce the enrollment to the stabilized postwar figure of 4,500 students as soon as this becomes practicable, the student body this year is still at a very high level. Enrollment this year is 5,474 which is only slightly less than the all-time peak of 5,662 reached last year and more than the 5,000 figure which had been forecast for this year. Of last year's student body, approximately 54 per cent were veterans as compared to 60 per cent for the preceding year; and approximately 22 per cent were married, as compared with 25 per cent for the preceding year. A total of 223 American colleges and universities and 88 foreign institutions in 47 countries were represented in the Institute's cosmopolitan student body which included 67 women.

Recognizing changed conditions to be encountered in the postwar period, the Institute inaugurated an annual salary plan for its Faculty members a few years ago. The success of this plan, under present economic conditions, was summarized by Dr. Compton in these words:

> The cost of living as measured by the Consumers' Price Index had risen, as of April of this year, nearly 70 per cent since 1939 — and is now still higher. Actually in American colleges increasing compensation of faculty members has fallen far behind the rising cost of living. At M.I.T. our average monthly academic staff salary rate has gone up about 30 per cent since 1939. By means of the annual salary plan instituted at the end of the war, and involving summer-term duties which had not been included before, the total assured take-home pay of our faculty has increased about 45 per cent. It should be pointed out, however, that many of our staff on the old nine-month plan earned extra compensation during the summer, both at the Institute and outside, opportunity for which has shrunk or vanished under the twelve-month plan. Thus, while the annual plan benefited the faculty as a whole, it may not in individual cases have increased the total compensation, and the actual average compensation from all sources has not increased by as much as 45 per cent. Also in this period the tuition has been raised by 16⅔ per cent.

The President's Report concluded with a summary of changes in personnel, nearly all of which have already been recorded in recent issues of The Review. All Alumni may take genuine satisfaction in witnessing the gradual development of plans for a new era at Technology, which are so ably envisioned and outlined in the President's Report of Dr. Compton.

(*Continued on page 118*)



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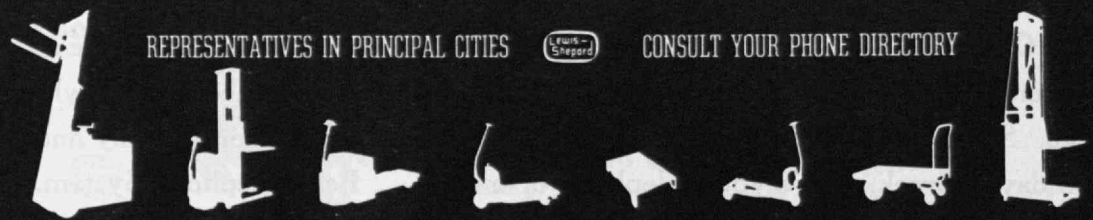
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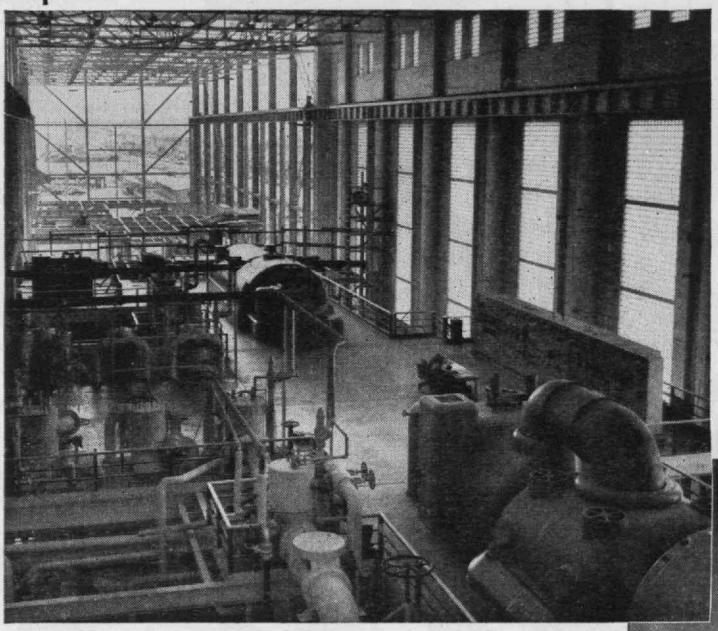
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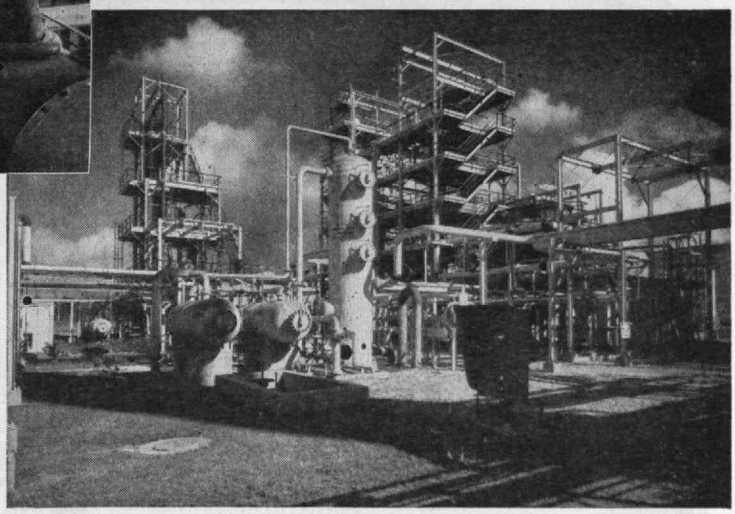


THE Common denominator



Interior view of First Section of new Redondo Steam Station of Southern California Edison Company, now under construction at Redondo Beach, California.

Crude Alcohol Unit of the Esso Standard Oil Company's Refinery at Baton Rouge, Louisiana.

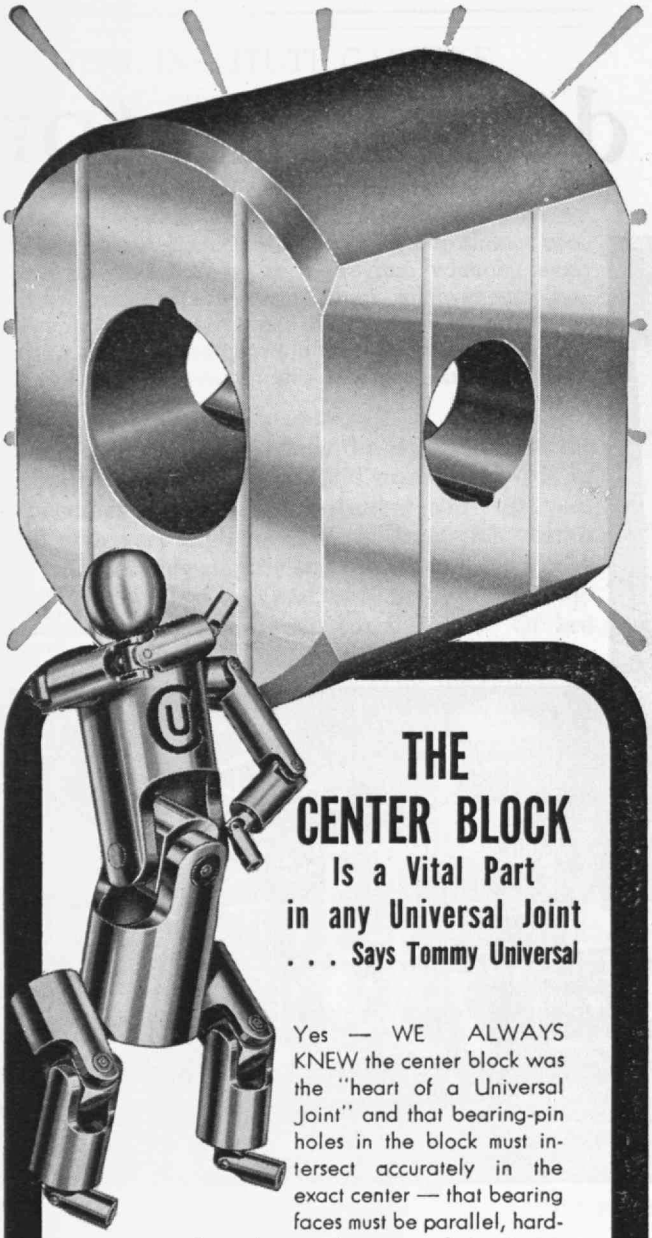


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(*Continued from page 116*)

From the Treasurer

In presenting his annual report on the financial status of the Institute at the Corporation meeting on October 4, Horace S. Ford, M.I.T. Treasurer, announced that the total volume of transactions for the fiscal year ending June 30, 1948, was $21,000,000 or $4,000,000 in excess of the 1947 figure. This increase is accounted for largely by additional revenues from research contracts, but the year's volume is considerably less than the all-time peak reached in the war period of 1945. Research contract revenues were $13,301,000 in 1948 compared to $9,825,000 in 1947.

With the largest enrollment in the Institute's history, income from students, including loan and scholarship awards, was $4,068,000 or $638,000 more than a year ago. In the 1947 fiscal year, two thirds of the income from tuition fees came from the Veterans Administration Office, but this figure has dropped to one half of the tuition receipts for the current year; it will drop still further in the coming year.

Academic expenses of $5,039,000 were $351,000 above the figure for 1947, with general administrative expenses $271,000 above the 1947 amount. Plant operation, including repairs and alterations, was $1,335,000, a decrease of $130,000 from the previous year. Total income exceeded expenses by $204,456 and the cumulative deficit for the Institute's 84 years of operation now stands at $21,119.

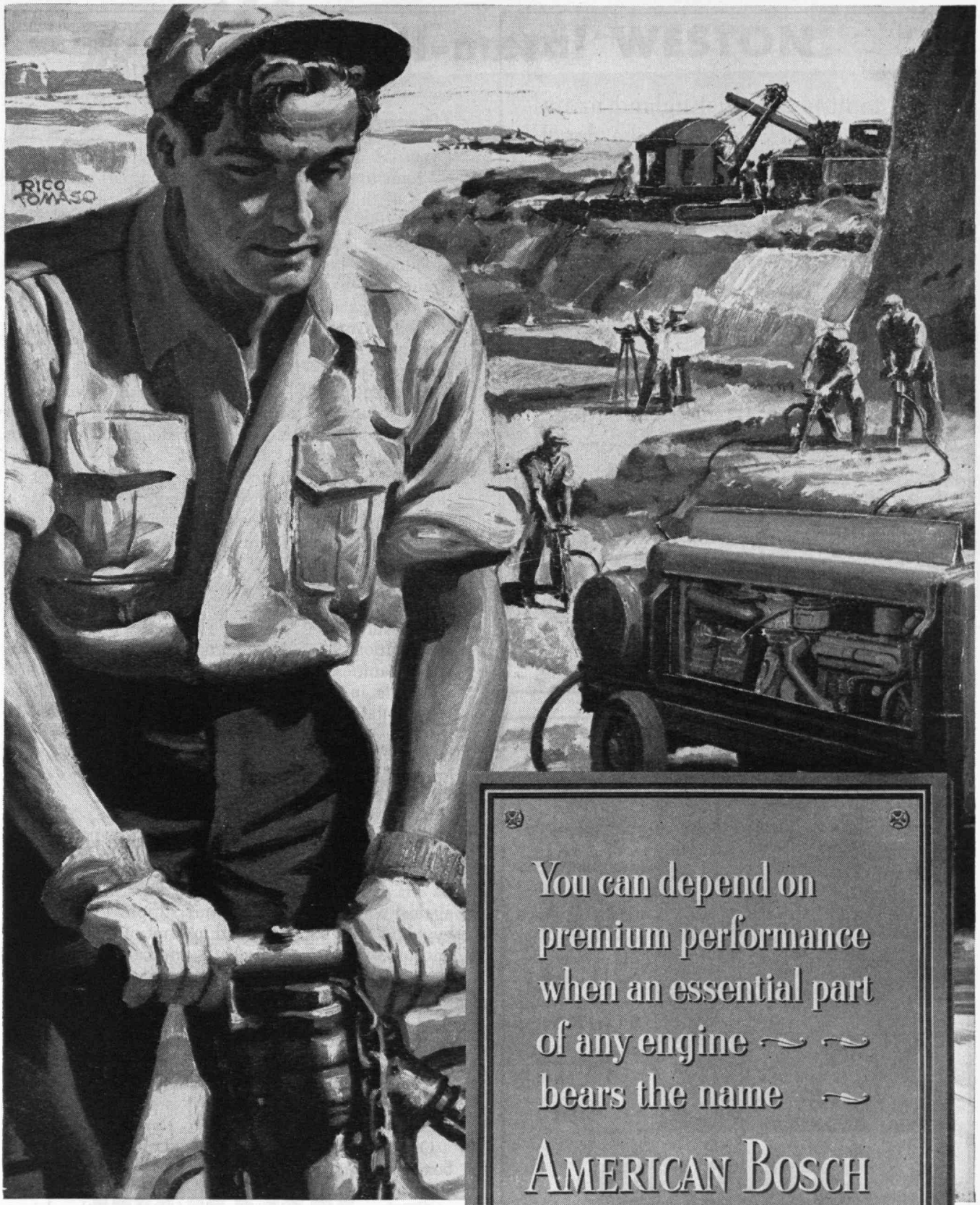
An interesting flow chart in the Treasurer's Report shows the manner in which income and expenses are distributed:

INCOME	**PER CENT**
Tuition, civilian students	10
Tuition, Veterans Administration	10
Income from investment	6
Gifts and other funds and receipts	8
Research contracts (reimbursement for administrative and plant expenses)	5
Research contracts (reimbursement for direct expenses)	55
Dormitories, dining services, and so on	6
EXPENSES	
Academic expenses	24
General and special administration	7
Plant operation	6
Medical and other expenses	2
Research contracts, direct expenses	55
Dormitories, dining facilities, and so on	6

The emphasis which the Institute has placed on extracurricular activities is reflected in increased operating costs in certain student activities. These are summarized from the Treasurer's Report as follows:

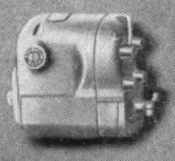
		ANNUAL EXPENDITURE		
ITEM	**AVERAGE FOR 1941-1945**	**1946**	**1947**	**1948**
Library operation	80,000	93,000	166,000	175,000
Medical Department	65,000	80,000	138,000	153,000
Undergraduate athletics, cultural, and recreation	100,000	112,000	170,000	207,000

(*Concluded on page 120*)



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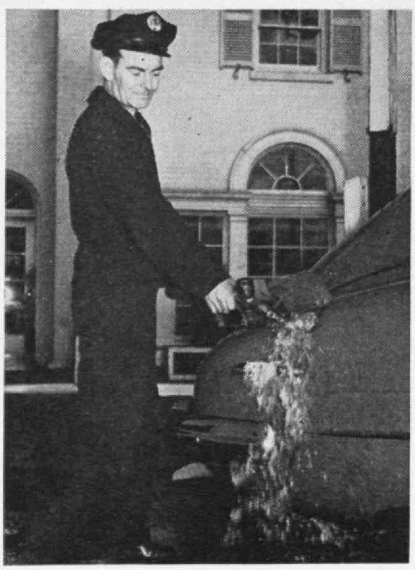
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THE INSTITUTE GAZETTE

(*Concluded from page 118*)

Humanities Series

SEVERAL important musical events and lectures will come to the Institute this year as a part of the program of the new M.I.T. Humanities Series. By supplementing other lectures and programs already organized at M.I.T., the Humanities Series aims to broaden the experiences and horizons of the technical students at the Institute.

The series was inaugurated on October 28 in an all-Beethoven program by the London String Quartet, arranged through the co-operation of Mrs. Elizabeth Sprague Coolidge. Interested members of the Faculty and student body filled Huntington Hall. By means of a public address installation, the concert was also made available to an overflow audience in the lecture hall of the Eastman Laboratories.

Lecturers now scheduled to appear in the Humanities Series at M.I.T. during the coming months are: C. Crane Brinton, Professor of Ancient and Modern History at Harvard University; F. S. C. Northrop, Professor of Philosophy in the Yale University Law School; and Margaret Mead, anthropologist with the American Museum of Natural History, New York, Dr. Killian announced in opening the series under the administration of Professor John E. Burchard, '23, Dean of Humanities.

Events in the M.I.T. Humanities Series will be representative of all five areas of studies involved in the Division of Humanities at the Institute. They will thus cover literature, history, music, economics, and business.

EARLY CHINESE ROCKETS

(*Continued from page 102*)

against wind and rain, and were supplied with straps by which they could be held in front of the soldier in position for use. Each basket carried about 20 arrows connected to a master match which passed through an aperture in the side of the basket. The arrows had steel tips smeared with poison, and carried pellets of incendiary composition which took fire after the driver charge had burned out. "These are particularly efficient for the burning of fodder, wall-towers, and ships. On meeting the enemy it is possible to anticipate the attack."

One portable launcher consisted of a small wooden box with a leather cover, arranged to fire a cluster of 100 small rocket-arrows. The shaft of each arrow was of bamboo, one and six-tenths feet long, the driver tube three-tenths of a foot long, and a piece of iron was attached behind the feather so that the center of gravity was four fingers width below the mouth of the driver tube. The arrows flew for a distance of more than 300 paces. Other sizes were used against boats and carts, but the kind described here was short and small, and intended to be carried in infantry battles

(*Concluded on page 122*)

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EARLY CHINESE ROCKETS

(Concluded from page 120)

on land by one soldier. Other launchers contained two sets of 25 rocket-arrows, the sets arranged to be fired separately from opposite ends of the carrying case (Fig. 7).

Another portable launcher (Fig. 8) fired 30 rocket-arrows having shafts two and nine-tenths feet long and driver tubes four-tenths of a foot long. "Each box is to weigh not more than five or six pounds, so that one soldier may carry it. Wait until the enemy is within 200 paces, then fire suddenly all at once. The effect is fierce, so that one soldier is superior to thirty."

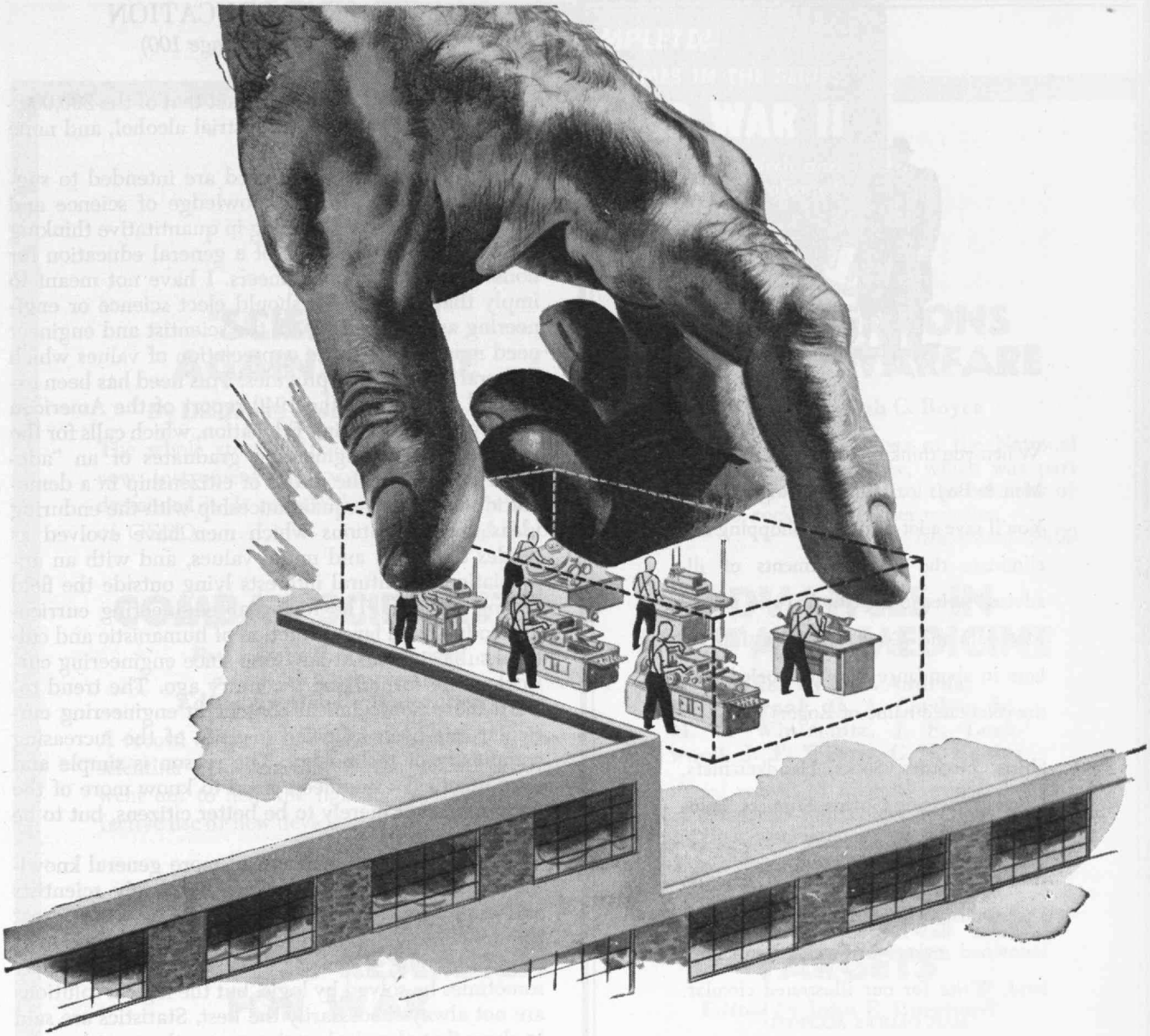
Another portable launcher (Fig. 9) fired 40 powerful rocket-arrows, sticks two and three-tenths feet long, driver tubes five-tenths of a foot long, carrying iron weights behind the feathers to bring the centers of gravity six fingers width below the mouths of the driver tubes. The arrows flew more than 400 paces. Before firing they were held in the launcher with their heads separated more widely than their tails, so that they spread out in flight and scattered transversally over a width of several hundred feet. "Whenever meeting with the enemy in the open country, merely with 10 or so boxes before the ranks, for a breadth of several thousand feet everything will be arrows."

A fixed launcher of a size to hold 100 or more rocket-arrows was made of wooden boards, and was set upon an iron axle between two supports so that it could be tilted to vary the range. "Whenever there are bandits to be suppressed, [this contrivance] being stationed on the strategic roads, aim it and fire. The arrows will go for several hundred paces. If these are made in several hundreds, it will indeed be a great help."

Before the early part of the Seventeenth Century Chinese ingenuity had already adapted rockets to a variety of special military uses, and had developed tactical techniques which are useful today with rockets carrying charges of high explosive. The Europeans of the same time had developed larger and fancier rockets for recreation and display. Biringuccio in 1540 described rockets which burst at the top of their flight sending forth six or eight other rockets or serpents,[3] and Hanzelet Lorrain (Jean Appier) in 1630 described rockets which threw out crackers (grasshoppers), stars, and serpents. The latter recommended the military use of rockets of six or seven pounds weight with grenades in their heads, which, he believed, would frighten both men and horses, and would easily break up a squadron of cavalry.[4] This is the only warlike application of rockets mentioned in his book, and represents, apparently, the most advanced thinking in Europe at that time on the tactical use of rockets in acts of warfare.

[3]*The Pirotechnia of Vannoccio Biringuccio, translated from the Italian with an introduction and notes by Cyril Stanley Smith & Martha Teach Gnudi,"* The American Institute of Mining and Metallurgical Engineers, New York, 1942, page 443.

[4]Lorrain, *La Pyrotechnie,* Pont à Mousson, 1630, pages 224–225; 234–239.



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SCIENCE IN EDUCATION

(*Continued from page 100*)

with this reasoning lies in the fact that of the 500,000,000 gallons, all of it was industrial alcohol, and none was for beverages.

The illustrations I have used are intended to suggest the value of a little knowledge of science and technology and some training in quantitative thinking as part of the perspective of a general education for nonscientists and nonengineers. I have not meant to imply that all students should elect science or engineering as careers. Indeed, the scientist and engineer need much more of the appreciation of values which a liberal arts training provides. This need has been expressed formally in the 1940 report of the American Society for Engineering Education, which calls for the development in engineering graduates of an "adequate concept of the duties of citizenship in a democratic society, an acquaintanceship with the enduring ideas and aspirations which men have evolved as guides to ethical and moral values, and with an appreciation of cultural interests lying outside the field of engineering." The four-year engineering curriculum today has a larger fraction of humanistic and cultural subjects than at any time since engineering curricula were formulated a century ago. The trend toward more nontechnical content in engineering curricular has been followed in spite of the increasing complexity of technology. The reason is simple and very practical – engineers need to know more of the humanities not merely to be better citizens, but to be better engineers.

If liberal arts graduates need more general knowledge of science and technology, certainly scientists and engineers need more breadth. Logic is a great thing but it is not to be revered as the only criterion of sound thought. Problems of human relations may sometimes be solved by logic, but the logical solutions are not always necessarily the best. Statistics are said to show that chemical engineers are the most happily married of professional people, but I suspect that, if true, this is due to wise rejection of logic in the inevitable domestic crises, rather than to the application of the scientific method to the problems of married life. Unless engineers understand the limitations of science and logic, their education may prove to be not only faulty but dangerous as well.

I do not know that it has been done, but I suspect a clever writer could make out quite a case for the benefits of war to civilization. In answer to the statement that wars never settle anything, he would point out that one war established this great country, and that a second war made it one. He would point out that the death rate due to automobile accidents in peacetime is half as great as the average death rate among United States military personnel during World War II. He would point to the wartime acceleration of medical research, which doubtless added more man-years to American lives than were lost during the war. Penicillin, a war baby, will save as many lives in a single year as this country lost in five years of war. Production and employment are at their peaks during a war. The

(*Concluded on page 126*)

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SCIENCE IN EDUCATION

(*Concluded from page 124*)

great wartime developments in atomic physics, which the war advanced by perhaps a generation, can reasonably be expected ultimately to mean as much to the improvement of man's material well-being in peacetime as did the industrial revolution. Properly developed and documented, such an argument would show by cold logic that we ought to promote a continuous war. If engineers or scientists, brought up on the scientific method and the sancity of logic, should be so lacking in a sense of values and so inculcated with materialistic philosophy as to be taken in by such an argument, then we should, indeed, close our schools of science and technology.

It is not sufficient to recognize that science has become more important than it was a generation ago; it is developing so rapidly that it may dominate our whole way of life. To educators and to students the implications are clear – schools of the liberal arts should provide more general education in science and its meaning to all of us; graduates in science and engineering should have that sense of values and awareness of the real place of science in men's lives without which they might use science for evil. In science today we have a giant in our midst and perhaps should remember Shakespeare's warning:

> "O, it is excellent
> To have a giant's strength; but it is tyrannous
> To use it like a giant."

ANDRÉ-MARIE AMPÈRE

(*Continued from page 108*)

and, at times, poetry. Toward the end of his life Ampère was working on an "Essay on the Philosophy of the Sciences" which, unfortunately, was never completed. This was a prodigious undertaking, and aimed to classify all sciences based on principles which, today, would be considered somewhat fanciful.

But of the many contributions of his versatile mind, Ampère will always be best known for his great cardinal formulation of electrodynamics – a branch of electricity which Ampère established almost alone in a few weeks of brilliant experimental research and mathematical analysis. This work is of sufficient importance to merit treatment in some detail, but Ampère's contribution may be better appreciated, however, after a survey of the state of electrical knowledge which led to his establishment of electrodynamics.

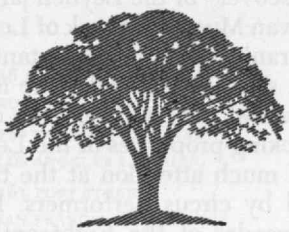
Electrical Science up to 1820

At the beginning of the Eighteenth Century, knowledge of electricity was meager, fragmentary, and unco-ordinated. There were no means for producing an electric current until 1800 and all studies of the new science were confined to an examination of electricity at rest – to which the name "electrostatics" has been given.

About 1720, Stephen Gray in England found that electric charges could be transmitted for distances of at least several hundred feet, and a dozen years later, in France, Charles François de Cisternay Du

(*Continued on page 128*)

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ANDRÉ-MARIE AMPÈRE

(*Continued from page 126*)

Fay recognized the difference between electrical conductors and insulators. Du Fay also discovered there were two kinds of electricity, and found that all materials could be electrified, under appropriate conditions, and so put a stop to the avid search then going on for new substances for electrification. Du Fay also established the first law of electrostatics; bodies charged with the same kind of electricity repelled one another, whereas bodies charged with different kinds of electricity exhibited a force of attraction. In experiments conducted at Philadelphia, about 1745, our own versatile Benjamin Franklin not only proved the electrical nature of lightning, as every schoolboy now knows, but developed the single-fluid theory of electricity which is the forerunner of our present notions.

The discovery of the Leyden jar, in 1745, independently by van Musschenbroek of Leyden and von Kleist of Pomerania, was an important step in electrical progress, since for the first time it made possible the collection and storing of electric charges. The peculiarly shocking properties of the Leyden jar discharges attracted much attention at the time and were even exploited by circus performers. In the seventh and eighth decades of the Eighteenth Century the first quantitive knowledge of electrostatics was developed. At the suggestion of Franklin, Priestley, in 1766, and Cavendish, in 1771, made the first determination of the law of forces of electrical charges in England. But it remained for the Frenchman, Coulomb, to develop the torsion balance with which he determined and enunciated the inverse square law of force for electric charges. This first quantitative law of electricity was stated by Coulomb in 1785, when Ampère was 10 years of age.

While England, France, and America were thus engaged in a study of electricity at rest, developments going on in Italy were to open up a new field of current electricity or electricity in motion. In 1789, Luigi Galvani, physician and anatomist in Bologna, dissected several frogs to study their nerve systems, and hung them from an iron balcony by means of small copper hooks. He observed that each time the wind blew strong enough for the frog legs to come in contact with the iron balcony, a twitching took place. Galvani carried out experiments which led him to conclude that the twitching was due to electrical causes which he incorrectly ascribed to animal electricity.

Galvani's work was studied by a contemporary compatriot, Alessandro Volta, professor at the University of Pavia. Volta concluded that the twitching was the result of action of the dissimilar metals, iron and copper, in the presence of moisture which produced an electric current. He found that acidulated water was even better than moisture, and challenged Galvani's conclusions. In a letter to the president of the Royal Society of London, Volta described his voltaic pile, the forerunner of the electric battery. This was in 1800, the year which marks the beginning of the use of current electricity by man.

(*Continued on page 130*)



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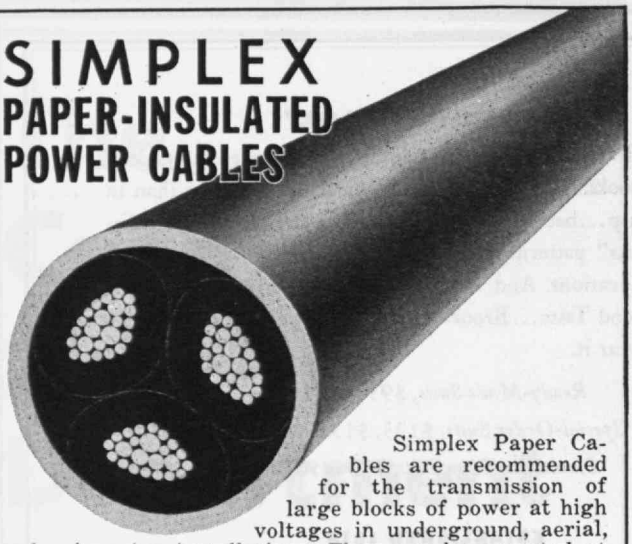
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ANDRÉ-MARIE AMPÈRE

(*Continued from page 128*)

With a means for producing an electric current, research in electricity was greatly stimulated. Davy used the voltaic pile to decompose water and there was controversy as to whether the current produced by the voltaic pile was the same as that produced by static electricity.

The relation between electricity and magnetism was long suspected, but it remained for Oersted, professor of physics at the University of Copenhagen, to establish this connection in the winter of 1819–1820. Placing a current-carrying conductor at right angles to the magnetic needle of a compass, Oersted observed the deflection of the needle as a result of the current flow. He reversed the direction of the current and the needle was deflected in the opposite direction. This was the first time any such effect between an electric current and a magnet was observed. Oersted described his experiments in a pamphlet published in Latin on July 21, 1820; a French translation by Arago appeared in the following August. Oersted's experiments pointed the way to what was to become an important development in electricity, but the Danish physicist was content merely to describe rather than to analyze his experiments. His experiments were the fulminating cap which set off Ampère's penetrating analytical ability.

In Switzerland, Arago had witnessed de La Rive perform Oersted's experiment. When he returned from that country, Arago repeated Oersted's experiment before the French Academy on September 11, 1820. Ampère was present. Exactly one week later, on September 18, 1820, Ampère read the first of four significant papers in which the work of Oersted and Arago was amplified and new concepts of the forces between current-carrying conductors were enunciated. With the aid of ingenious experiments he verified, predicted, and generalized the forces acting between current-carrying conductors. In an article in the *Annales de Chimie et de Physique*, in 1822, Ampère established the now well-known fundamental laws of electrodynamics which may be summarized as follows:

1. When the direction of the current flow is reversed, the magnetic effect of the current is likewise reversed.

2. The effect of a current flowing in a circuit composed of a twisted pair of conductors is the same as if the circuit were smoothed out.

3. The force exerted by the magnetic effect of a closed circuit, acting on an element of another circuit, is at right angles to the latter.

4. If the magnitudes of the currents flowing in two circuits remain unchanged, the force between the two circuits is unaffected when all linear dimensions are changed in the same proportion.

Ampère also showed that the magnetic effect produced by an electric current is equivalent to a distribution of magnetism on a surface of which the circuit is the boundary. His development of electrodynamics was presented in final form before the Institut in

(*Continued on page 132*)



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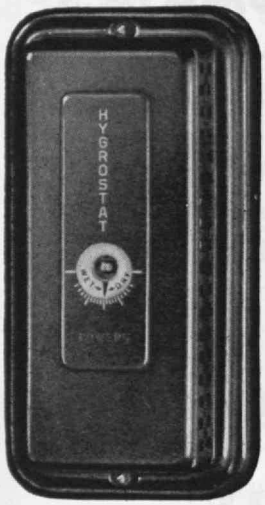


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ANDRÉ-MARIE AMPÈRE

(*Continued from page 130*)

1826 in a paper entitled *Théorie Mathématique des Phénomenes Electrodynamiques Uniquement Déduite de l'Expérience.* Thus, in the brief period of six years, an entirely new field of electricity was opened up by Ampère, while the major portion of his important contributions were made within a month after he learned of Oersted's experiments from the demonstration made by Arago.

Ampère's Name Immortalized

Almost a half of a century slipped by after Ampère's death (45 years to be exact) and nothing was done to memorialize the name of him who founded the science of electrodynamics. But there were men who had not forgotten. In 1881, in the city of Paris, there where Ampère had done such brilliant work, a meeting of the International Congress of Electricians was held. Having in mind the remark of the brilliant Scotch physicist, Clerk Maxwell, who said that Ampère was "the Newton of Electricity," Helmholtz, the famous German physicist, proposed that the practical unit of electric current be named *Ampère.* Others suggested that the unit be called the *Weber,* after a German physicist who was still living. But Helmholtz, aided by the efforts of Mascart, the French physicist and meteorologist, won out. What a delightful and gracious *beau geste* of the German Helmholtz.

But Ampère's name is not memorialized alone in the practical unit of electric current. Streets, squares, avenues, public schools, and public buildings were named after him at home and abroad. Some readers of these pages may have taken a train ride from Hoboken to East Orange, N.J., during which they would have found themselves passing a station bearing the name *Ampere.* The town has many small establishments, including a theater, a bank, and a street, all called by the name of Ampere. Ampere, in the state of New Jersey, is a town within a city — the city being East Orange. How has this come about? It was in 1893, and through the efforts of Francis B. Crocker and Schuyler Skaats Wheeler, that the station in East Orange, formerly known as Crescent, was named Ampere. A plaque bearing the bas-relief of Ampère was unveiled in October, 1908, by the French ambassador to the United States, Jules Jusserand, in the presence of many distinguished men of science.

(*Concluded on page 134*)

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ANDRÉ-MARIE AMPÈRE

(*Concluded from page 132*)

On December 4, 1920, on the one hundredth anniversary of Ampère's discoveries, a bronze wreath and tablet were added. Prince de Béarn, of the French Embassy, officiated, and speeches were made by Michael I. Pupin and many others.

At the time of the centenary of his death, Georges Kempflin wrote a short account of Ampère in the French newspaper *Paris Soir,* including his intimate life. He said:

It was at Poleymieux where he met Julie Carron, the great love of his twenties. First and delicious romance, the ups and downs of which the lover wrote in his diary with touching simplicity . . . "We went into the lane where I climbed the big cherry tree . . . I ate the cherries which were in her lap . . . we went into the big garden where she accepted a lily from my hand . . . lastly we went to see the brook." Simple words these but how touching—they reach right into the heart.

The hours spent at Poleymieux were the happiest hours of the life of the great man. They were short. Five years of happiness[8] without a cloud and the book was closed. Julie died leaving this fine and great man of science, and promises of fame, in the deepest affliction.

The brook is always there; in the springtime there are always lilies in the garden and cherries in the cherry tree. The souvenir of her who lit the great fire floats anew in these places as of yore. This is due to the munificence of two Americans, Hernand and Sosthènes Behn, that the old family house of Ampère has become the property of his spiritual descendants, The Society of the Friends of Ampere who have made it into a sanctuary of the souvenirs and a museum of Ampère's discoveries.

For 67 years, since 1881, the world has known the word *ampere.* We hope that, at least those who have read this article, will now also know the man—the Frenchman a German immortalized—*André-Marie Ampère.*

[8] This is incorrect. It was only four years. See page 107.

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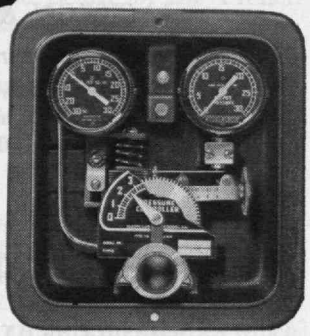
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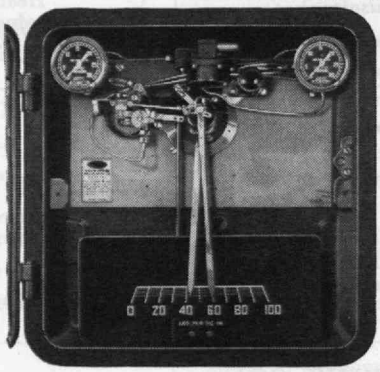
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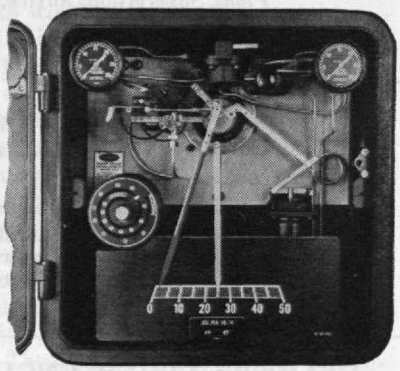
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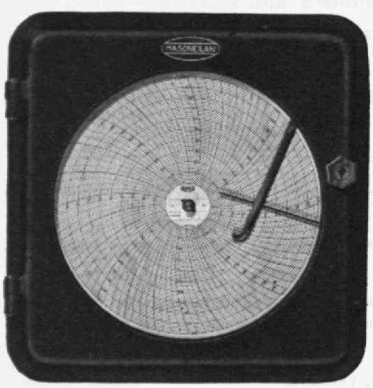
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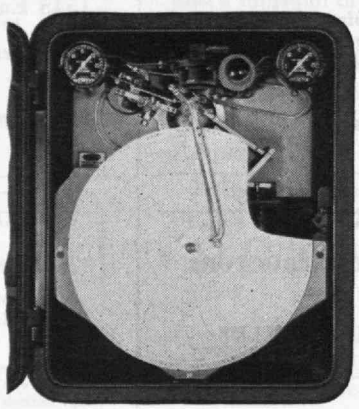
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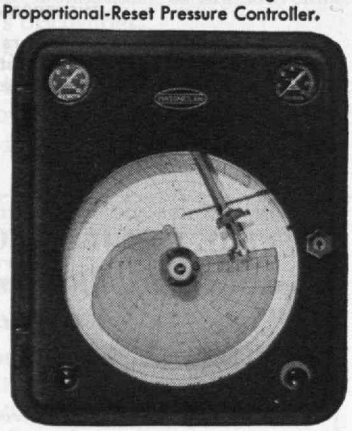
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END OF FISCAL '48

For many, December 31 marks the end of another fiscal year. For all, it is the end of another tax year. It is an opportune time, then, to consider once again your status in respect to our annual Alumni Fund.

By early November the Fund had passed the 8,000 contributor mark, was approaching $120,000 in amount. The former figure is almost identical with that of last year at the same time, the latter lags. Will you take a moment to consider what you can do to advance the Fund?

With but few exceptions those who receive this issue of The Review have either contributed already this year, or were contributors last year but have not as yet given to the 1948–49 Fund. If you are in the first group, will you consider the size of your contribution? If you have already done all you consider you can or should do, splendid. You have the sincere thanks of the Fund organization and of the Institute itself. But some give token amounts initially, then at the end of the year increase their contributions by whatever amount they consider proper. Are you one of these? Does the "fifty-cent-dollar" mean that former concepts of what is a proper amount need upward revision? And considering the tax deduction aspect, does your Fund giving warrant reexamination?

To those of you who have not yet given, but have done so in the past, this is the logical time for a reaffirmation of your faith and pride in M.I.T. and all it stands for. You have evidenced that faith in previous years by joining with your fellow Alumni in this annual fund-raising effort. You have thereby helped materially to add to the capital resources of the Institute. Now, when its pressing needs make every dollar count as seldom before, make the end of Fiscal '48 the time for your gift to M.I.T. once again.

Alumni AND Officers IN THE News

IN PRINT

• HERMON F. BELL'03 surveys *Religion Through the Ages* in his recent volume of the same title published by the Philosophical Library, New York. 1948.

• EDWARD H. CAMERON'13 cries out against stodgy conventionalism in his article, "Mental Cramps of the Engineer Writer," which has been reprinted in booklet form from *Industrial Arts and Vocational Education,* March and April, 1948.

• JAMES A. TOBEY'15 gives some healthy advice in *Your Diet for Longer Life,* published by Wilfred Funk, Inc., New York. 1948.

• ERNEST H. HUNTRESS'20, Professor of Organic Chemistry at the Institute, is the author of the weighty volume on the preparation, properties, chemical behavior, and identification of *Organic Chlorine Compounds,* published by John Wiley and Sons, Inc. 1948.

• DAVID O. WOODBURY'21 makes a contribution to literature on industrial mobilization during the War with *Battlefronts of Industry.* John Wiley and Sons, Inc. 1948.

• RALPH M. EVANS'28 adds luster to his achievements with *An Introduction to Color* which has been published by John Wiley and Sons, Inc. 1948.

• GORDON S. BROWN'31 and Donald B. Campbell'43 share the honors for *Principles of Servomechanisms,* published by John Wiley and Sons, Inc. 1948.

• F. ROLF MORRAL'32 provides grist for metal processing publications with his articles: "Demineralization of Water," in *Metal Finishing,* July, 1948; "Modern Heat Treating, A Reference Index," in *The Iron Age,* June 10, 1948; "Quenching Steel in Molten Media," in *Steel,* June 21, 1948; and "Corrosion by Molten Materials," parts I and II in *Wire,* June and July, 1948, respectively.

ON THE PLATFORM

• LAWRENCE H. FLETT'18, a pioneer in the development of "soapless soaps," spoke before the Chemical Engineers Club of Washington on September 20. Dr. Flett's topic was "Synthetic Detergents, Their Manufacture and Utility."

• AUGUSTUS B. KINZEL'21 was the speaker on October 14 at a joint meeting of the Western New York section of the American Society for Metals and the Buffalo chapter of the American Welding Society. His subject was, "The Metallurgy of Welding."

• RICHARD S. MORSE'33 was in Scotland on October 12 where he spoke on the "Application of High Vacua to Distillation" before the High Vacua Convention.

• JAMES H. MOORE'40 discussed "Vacuum Furnaces and Melting" at a September meeting of the New Haven chapter of the American Society for Metals.

FOR OUTSTANDING SERVICE

• HAROLD M. CHASE'94 has been honored by the American Association of Textile Chemists and Colorists as the 1948 recipient of the Olney Medal for achievements in the field of textile chemistry.

• VANNEVAR BUSH'16, for his leadership in the Office of Scientific Research and Development, has been awarded the 1949 medal of the Industrial Research Institute, Inc. The award will be presented in February, 1949.

• Twenty-two members of the Faculty received Presidential Certificates of Merit from Major General Frank A. Keating, Commanding General of the First Service Command, in exercises held at the Institute on October 14. Recognized for services rendered the wartime Office of Scientific Research and Development, were the following: ALAN C. BEMIS'30, LEO L. BERANEK, GORDON S. BROWN'31, LAN J. CHU'35, ARTHUR C. COPE, ROBLEY D. EVANS, ERNST A. GUILLEMIN'24, ARTHUR C. HARDY'18, HAROLD L. HAZEN '24, ALBERT G. HILL, MALCOLM M. HUBBARD'29, DONALD E. KERR'37, JOHN R. LOOFBOUROW, RICHARD C. LORD, JR., WILLIAM H. MCADAMS'17, NATHANIEL MCL. SAGE'13, JOHN C. SLATER, HORTON G. STEVER, JOHN G. TRUMP'33, GEORGE E. VALLEY, JR.,'35, ARTHUR R. VON HIPPEL, and JEROME B. WIESNER. Certificates were presented to JAMES R. KILLIAN, JR., '26 and JERROLD R. ZACHARIAS in absentia. Later in the month, DONALD B. SINCLAIR '31 and FRANK D. LEWIS'37 were also recipients of this award.

OBITUARY

° *Mentioned in class notes.*

EDWARD B. HAYWARD'84, August 25.
MARION TALBOT'88, October 20.°
EDWARD M. BEALS'90, in 1947.°
GEORGE B. MCBEAN'90, June 23, 1936.
FRANCIS C. GREEN'95, August 17.°
RICHARD MOREY'95, date unknown.
A. LEBARON RUSSELL'96, October 5.
J. LLOYD WAYNE,3D,'96, October 10.°
GEORGE W. PIGMAN'00, June 30.
SIDNEY F. ROSS'00, May 31.
ALBERT P. STOCK'00, date unknown.
CHARLES A. WHITTEMORE'01, September 4.
E. LEROY BRAINERD'02, October 10.
JESSE J. EAMES'02, October 14.°
RALPH E. KIMBALL'02, February 12.
CHARLES F. BARRETT'04, September 14.°
ARTHUR R. HOLBROOK'04, August 2.°
ROBERTS S. FOULDS'05, June 20.
HORACE MACINTIRE'05, July 15.°
HANS F. SCHAEFER'05, September 9.
FOREST O. SPRAGUE'05, January 20.
ELLIS G. WOOD'05, August 13.°
EDWARD L. HIMMELMAN'06, in 1931.
FRANK S. HAMILTON'07, date unknown.
HOWARD MORTON'07, April 30.
EDWARD E. ALLEN'08, May 11.
WILLIAM E. HAUGAARD'10, September 16.°
IRVING R. PRAY'11, August 27.°
RAYMOND E. PALMER'13, August 26.
EARL S. PARKER'14, March 5.
D. FRANK RYAN'16, October, 1943.
WOLFRAM A. C. FUTTERER'17, June 29.°
HERBERT M. PALMER'18, October 1.
EUGENE L. KLOCKE'19, May 29.
GEORGE H. CROCKER'20, date unknown.
FRANK D. WILCOX'20, April 18, 1943.
RAY PATTEN'21, September 13.°
FREDERICK MILES'22, October 5.°
JACOB G. SUCHER'22, May 11.
GEORGE T. GILMAN'23, September 18.°
Y. SUBBA ROW'26, August 9.
IVAN P. SWEENEY'28, August 5.
WILLIAM C. CORRELL'34, date unknown.
JAMES S. NEARY'34, February 5, 1945.
ARTHUR R. FORD'37, August 13.
AUGUSTIN MURILLO-FERNANDEZ'40, July 4, 1945.
LOUIS C. GERRY, JR.,'46, June 20.
WILLIAM B. RAMSEY'46, September 28.

News FROM THE Clubs AND Classes

CLUB NOTES

Civil Engineers Centennial

The American Society of Civil Engineers, which was established in 1852 and is the oldest national engineering society in the United States, selected Boston as the scene of its 1948 fall meeting. With headquarters at the Hotel Statler, this meeting was held from October 13 through October 15 in honor of the Boston Society of Civil Engineers, the oldest engineering society in America which was organized on July 3, 1848, and is celebrating its 100th anniversary this year. Details of the celebration are contained in the centennial anniversary issue of the *Journal of the Boston Society of Civil Engineers,* Volume XXXV, Number three, Section two.

The following speeches were given by Alumni and staff members who took part in the three-day meeting: Miles N. Clair '23, President, Northeastern Section, American Society of Civil Engineers, "Welcome by Northeastern Section"; George R. Harrison, staff, "A Scientist Looks at Engineering"; John B. Babcock, 3d,'10, "Mutual Ties between Americas Two Oldest Engineering Societies – the Boston Society of Civil Engineers and the American Society of Civil Engineers."

Thomas R. Camp'25, E. Sherman Chase '06, William L. Hyland'22, Murray H. Mellish'10, and Karl R. Kennison'08 presented papers before the sanitary engineering division. Gordon M. Fair'16 presided at this session. Donald W. Taylor'34 and Philip C. Rutledge'33, presented papers before the soil mechanics and foundations division. Robert J. Hansen'48 and Charles M. Spofford'93, formerly Head of the Department of Civil and Sanitary Engineering, presented papers before the structural division. Herman J. Shea'33 led the discussion on "Control Surveying in Massachusetts" before the surveying and mapping division.

Harrison P. Eddy, Jr.,'17 was general chairman of the fall meeting; Albert Haertlein'18 was director, Emil A. Gramstorff'17 was chairman of the student participation committee, and Ralph W. Horne'10 was chairman of the entertainment and transportation committee. Other members of various committees included: Carroll A. Farwell'06, Edward H. Cameron'13, Lincoln W. Ryder'33, Francis H. Kingsbury'12, William E. Stanley, staff, and F. M. Cahaly'33.

Past Presidents of the Boston Society of Civil Engineers who attended the 100th anniversary meeting included the following Alumni: Charles M. Spofford'93, Harold K. Barrows'95, Charles B. Breed '97, Carroll A. Farwell'06, Karl R. Kennison'08, Arthur L. Shaw'09, John B. Babcock,3d,'10, Ralph W. Horne'10, Gordon M. Fair'16, Albert Haertlein'18, and Frank A. Marston'26.

M.I.T. Club of Albany

William L. Campbell'15, Head of the Department of Food Technology at the Institute, was our guest at the fall meeting of the Club held in the Wellington Hotel on October 14. Professor Campbell brought to us recent news of the Institute and its activities and spoke of the work his department is doing in the application of war research to peacetime uses.

The Club joins the Institute in its sense of loss upon the death of Professor Charles E. Locke'96. He will be missed greatly for the help and encouragement he has so often given. It is with sorrow also that we note the passing of James G. Melluish'96, IX, who for many years had been a member of the Club. – GEORGE W. SCHAIBLE '30, *Secretary,* 158 State Street, Albany, N.Y.

Berkshire M.I.T. Club

The Club is entering its second year since its rebirth following many years of dormancy. There are 120 Alumni on the mailing list and about 30 active members. In the past year the Club has had talks by Professor Timbie, Professor Schell'12 and O. B. Denison'11. Attendance was encouraging at all events, and we look to the future with confidence. Our first meeting of the current year will be held October 26, at the Hotel Sheraton, at which time Pittsfield's young liberal mayor, the Hon. Robert Capeless, will lead a discussion on "Where the Engineer Can Take a More Active Part in the Community." This is in keeping with the "new look" at the Institute.

Our Club is unanimous in welcoming Dr. Killian as the Institute's president, and wish Dr. Compton God's guidance in his new work. Dr. Bush may be sure that the calibre of work he has been doing will be carried on. We rest secure. – ROBERT T. GAGE'42, *Secretary,* 50 Stratford Avenue, Pittsfield, Mass.

M.I.T. Club of Central New York

A club picnic at the home of Ted Simonton'24 on Cazenovia Lake took place on October 2. Everyone had an enjoyable time pitching horseshoes, sailboating, speedboating, or just taking it easy. The day was completed by a supper cooked over an outdoor fireplace.

On November 16 we are planning a ladies' night at Tubberts in Syracuse. After the dinner we will be favored with colored slides taken by Earle MacLeod'38 on his recent three weeks' vacation tour through the West. We expect this meeting to be one of the highlights of our activities for the year. – FREDERICK S. HODGDON'42, *Secretary,* Rural Delivery 1, Marietta, N.Y.

M.I.T. Club of Chicago

The first meeting of the Club on its 1948–1949 program was held at the Chicago Electric Club on October 20. There was an excellent attendance of more than 85 Alumni and guests. The meeting was opened by the new Club President, Herb Kochs'25, who introduced the event chairman, Bob Gunness'34, who in turn introduced the speaker of the evening, W. K. Lewis'05, Professor of Chemical Engineering at the Institute. Dr. Lewis presented a most interesting and enlightening talk, "M.I.T. Looks Ahead Educationally."

Seated at the head table were: Herb Kochs'25, W. K. Lewis'05, Bob Gunness '34, Ed Farrand'21, Jay Pratt'12, Sherry O'Brien'17, and Bob Clyne'30. Also present were: John Barriger'21, Vice-president; J. G. Praetz'28, Secretary; and Dick Meyer'42, Treasurer.

The very excellent dinner arrangements were made by Al Mulliken'32, dinner chairman. Our Club now boasts a paid membership of over 250. The next meeting is scheduled for early December. – JOHN G. PRAETZ'28, *Secretary,* Liquid Carbonic Company, 3100 South Kedzie Avenue, Chicago, Ill.

M.I.T. Club of the Connecticut Valley

The Club celebrated Ladies' Night on August 25 at Turner Park, Longmeadow. Although the weather was very hot and many members were on vacation, a representative turnout enjoyed a delicious old-fashioned charcoal-broiled steak dinner. Numerous door prizes were distributed and some of the members heard the new M.I.T. Record for the first time. Dancing followed for those who desired and the remainder enjoyed an old-fashioned "gab fest" – not charcoal broiled.

On October 14 the first meeting of the current season was held at the Hotel Kimball in Springfield in co-operation with the Smaller Business Association of New England. Our president, Minot Edwards'22, who is also a director of the Smaller Business Association, arranged the meeting. Speakers were Edward V. Hickey, consultant, National Security Resources Board, Washington, D.C.; Edwin A. Boyan'36, Assistant Professor of Business and Engineering Administration at the Institute; and Howard D. Williams'11, Vice-president of the Smaller Business Association. Professor Boyan's subject, "The Case of the Reluctant Recession," stressed the need for strength in all the basic requirements for the operation of a small business capital, diversified products, development and cultivation of markets, buildings, machinery, materials and labor. He emphasized that a weakness in any one of these could prove disastrous and that small business should remove its basic weaknesses and strengthen its assets.

Mr. Hickey told of the work being done now and that planned for the future to prepare and co-ordinate the industry of the country against the threat of possible war. "Industry is mobilizing industry" he said, explaining that the mistakes of the past in mobilizing the country's resources, industry, and manpower will not be made again, when and if a shooting war develops. The meeting was well reported in all the Springfield newspapers and was treated editorially in the Sunday *Republican*. Fifteen communities were represented at the meeting and approximately 40 per cent of those present were Alumni. – ALBERT M. LOVENBERG'16, *Secretary*, 66 Belmont Avenue, Springfield, Mass.

The M.I.T. Club of the Lehigh Valley

The passing of Charles E. Locke'96 dulls the spirit of this new alumni organization for which he worked so hard in his last year. The Club bows in tribute to the man whose life was devoted to the cause of M.I.T.

On August 14, the Club held a picnic at Hess Lehigh Farm, near Allentown, Pa. Twenty-two members were present and enjoyed an afternoon of sports and reminiscing. Beer (real and birch) for the occasion was supplied by Al Smith'27 who is brewmaster of the Gibbons Brewery, Kingston, Pa. Al supplemented his liquid refreshments with an informal discussion of the technique of brewing beers and ales. In the sporting events, the Allentown-Bethlehem men were pitted against those from other parts of the Valley. The A-B's won in the tug-o'-war but the situation was reversed in a softball game, largely through the efforts of L. A. Wilson'14. In the quoits department C. W. Gotherman '13 was outstripped by E. A. Richardson '19. Arrangements for the picnic were very ably handled by George Farnell'41.

The executive committee held its first meeting of the new season on September 22 and outlined the tentative program for the year. The first club meeting is to be held in Reading, Pa., the second in Allentown and the annual meeting in Bethlehem. – MICHAEL V. HERASIMCHUK'39, *Secretary*, Post Office Box 495, Bethlehem, Pa.

The M.I.T. Club of New York

The annual stein and steak dinner was held on September 29 and George Ruppert of Ruppert's Brewery was our genial host. Some 175 men turned out and Jimmy Walker'26, and Bill Kennedy'21, are to be congratulated for organizing a fine affair. Harry Fisher (Williams) made us feel very much at home and Charlie Carver's stories were excellent.

Plans are well underway for the alumni banquet which will be held at the Biltmore Hotel on Tuesday, December 7. As previously announced, we are honoring C. George Dandrow'22 this year, who is president of the Alumni Association. Dr. Karl Compton, our new Chairman of the Corporation, and Jim Killian'26 the new President of the Institute will be on hand; along with Mrs. Compton and Mrs. Killian. We are hoping that Bob Wilson'16, chairman of the board of Standard Oil of Indiana will be on hand to act as toastmaster for the occasion. Larry Davis'22 is general chairman of the committee which consists of Dunc Linsley'22, Sam Reynolds'22, A. L. Bruneau, Jr.,'38, Al Glassett'20, Dave Minton'22, and your Secretary. The dress for the occasion will be optional. There will be a cocktail party in the Fountain Room at 6:00 P.M. to which all are invited; dinner will be at 7:00 P.M. in the main ballroom. The cost will be $7.50 each and patrons tickets are available at $12.50 each. Please send in your checks and reservations promptly upon receipt of your application blank. Seating arrangements will be by classes unless otherwise requested. This will be our biggest party of the year and I urge all Alumni to attend whether they are club members or not.

We are happy to report among our new members, Constantine Dadakis'34 and Thomas D'A. Brophy'16. Tom Brophy is president of Kenyon and Eckhardt, Inc. – Bill Correale'24 has moved to 34–35 76th Street, Jackson Heights, Long Island, N.Y. – We regret to announce the passing of George T. Gilman'23 since our last news item.

In the near future the board of governors plan to announce some changes in our membership requirements. It is hoped that the changes will result in several hundred new members – more on this at a later date. – WILLIAM W. QUARLES'24, *Secretary*, 330 West 42d Street, New York 18, N.Y.

M.I.T. Club of Northern New Jersey

The 1948–1949 program of the Club was outlined in the annual president's letter mailed early in the fall to all known Alumni in the club district. Clayt Grover '22 announced a beer party, two smokers, and a ladies' night dinner scheduled for October, January, March and May respectively. In addition to Program Chairman Ed Asch's success in lining up timely and interesting speakers for the meetings, two other changes promise to attract large gatherings of Alumni. First, the meetings will be held on different nights of the week so that those who have regular engagements for bowling, bridge and so forth, will not find a conflict in dates for every meeting. Second, we are leaving the Essex House Hotel in Newark, and will gather at two or three other centrally located and congenial meeting places. It is the hope this year to revise and correct the directory of Alumni in Northern New Jersey, last issued in 1946. A complete up-to-date roster proved very valuable to many of the members, and there are many changes to be incorporated in the new one.

Of interest to Institute graduates generally is the note from Placement Chairman George A. Chutter'21, 109 Central Avenue, Glen Rock, N.J., that he is in touch with several candidates for employment in a variety of fields and would like to make contact with any organization that is searching for qualified men. This is an important function and deserves assistance. All who wish to receive notices of meetings are urged to write or phone: President Clayton D. Grover, 285 Vose Avenue, South Orange, N.J., so 2-0428; Vice-president Russell E. Lowe'16, 112 Lincoln Street, East Orange, N.J., OR 3-1956; or your Secretary. – FLETCHER P. THORNTON, JR.,'36, *Secretary*, 1 Primrose Place, Summit, N.J. SU 6-6935M.

M.I.T. Club of Philadelphia

James McGowan, Jr.,'08, President of the Campbell Soup Company and a member of the M.I.T. Corporation, proved his point in superb fashion on October 19. The date was that of our fall dinner meeting, and Mr. McGowan's point was that the key to successful meetings consisted of an excellent dinner at rockbottom price in addition to an entertaining program. He has long been a proponent of low-cost meetings, for the benefit of the younger Alumni especially. We had our meeting in one of the attractive dining rooms of the Campbell Soup Company in Camden. The turnout broke all previous records as 207 Alumni and guests sat down to the best dinner ever served under the Club's auspices. For those unfortunates unable to attend, we give the menu here: Celery, olives and mixed pickles, fruit cup, cream of chicken soup, delicious tenderloin steak, french fried potatoes, green peas, spring salad, homemade apple pie á la mode, and coffee. The price, thanks to Mr. McGowan, was only $1.75, of which 25 cents was allocated to partially defray the cost of the notices.

The first speaker of the evening was C. George Dandrow'22, Vice-president and General Sales Manager, Industrial Products Division, Johns-Manville Sales Corporation, President of the Alumni Association, and a member of the M.I.T. Corporation. Herbert W. Anderson'15, our second speaker, showed Kodachrome movies and related his experiences on an aerial trip throughout Europe and return. Mr. Anderson is chairman of the board of Haskell-Dawes Machine Company and president of H. Brinton Company. The evening closed with the showing of a Campbell Soup Company film which was the next best thing to an actual trip through the plant. Everyone was presented with samples of the popular Campbell soups. This meeting was extremely well received by the Philadelphia Alumni with hearty approvals from all those present, but it should be remembered that this was a very special occasion. Members of the Class of 1948 living in this area were guests of the Club at the fall dinner meeting. They were: R. Clark DuBois, Ezra Garforth, Jr., Conrad H. Knerr, Harold F. MacWilliams, Jr., Thomas L. Mell, Thomas J. Schlottenmier, William S. Spiller, Frank Viera, Jr., and Milo V. Wilson, Jr.

The following Alumni and their guests attended: Arnold S. Ackiss'30, John N. Aitken,3d,'46, Philip M. Alden'22, Claude A. Anderson'05, Herbert W. Anderson'15, A. Rufus Applegarth, Jr.,'35, Richard M. Armstrong'33, Frederick P. Baggerman '37, Anthony P. Barbato'44, Alexander T. Barclay'22, George M. Bartlett'05, J. Justin Basch'17, Walter J. Beadle'17, Dudley E. Bell'17, William H. Bertolet,3d,'48, George E. Bierce, Jr.,'47, Vernon L. Bigsby '30, Frederick J. Blatz, Jr.,'44, John S. Bleecker'98, Louis D. Bloom'37, Harry L.

Bowman'14, Edward H. Bowman'47, E. Miles Brown'39, O. Donn Burton'18, Smedley D. Butler, Jr.,'31, A. C. Carlton '17, Nicholas E. Carr, Jr.,'39, Charles A. Cary'12, R. E. Cernea'25, Frank S. Chaplin'32, Francis J. Chesterman'05, Morris A. Chomitz'46, Chih Teih Chu'22, J. Ernest D. Clarkson'21, Samuel Clayman '17, Freeman A. Cobb'04, Runyon Colie, Jr.,'40, Wiley F. Corl, Jr.,'39, Frank N. Cramton'26, Paul J. Culhane'23, C. George Dandrow'22, Richard A. Denton'36, William C. Dickerman, Jr.,'30, Henry S. Dimmick'22, Ernest K. Dockstader'35, John L. Dodson'31, John A. Eaton'40, William W. Eaton'97, Carlos P. Echeverria'12, Robert C. Eddy'38, Edmund Engle'47, J. Nelson Evoy'42, Victor S. Ezykowski'44, Samuel P. Felix, Jr.,'39, John J. Ferencsik '47, Edward M. Fettes, Jr.,'40, Charles J. Fisher'46, Robert G. Fisher'44, Garland Fulton'17, G. L. Fulton'48, Gregory G. Gagarin'43, Richard D. Gerges'40, Francis Goodale'17, Richard L. Graff'39, Simon E. Gluck'43, Daniel C. Hall'19, Robert M. Harbeck'28, Eugene A. Hardin'21, Charles W. Hargens,3d,'41, Kenneth L. Harper'17, Stephen B. Hazzard'43, Edward J. Healy '23, Karl E. W. Hellsen'32, Stephen P. Higgins, Jr.,'43, William G. Horsch'13, Lewis W. Hull'38, Harold L. Humes'22, Frederic R. Innes'46, Henry W. Jones'26, John F. Joyce'29, Alfred P. Kitchen'14, Burkhart A. Kleinhofer'39, P. Arvid Knudsen'47, Kenneth V. Kratochvil'44, Harry A. Kuljian'19, Vahey Kupelian'39, Joe W. Langran'47, George T. Logan'29, Robert A. Lombard'47, Kenneth S. Lord'26, William E. Lunt, Jr.,'40, Charles V. Lynch, Jr.,'44,

Harold C. Mabbott'12, William H. MacCallum'24, J. Robert McCaa'32, Samuel K. McCauley'41, Howard H. McChesney'07, Harry B. McCurdy'44, James McGowan, Jr.,'08, James D. McLean'37, George C. Maling'22, Elwood McE. Manter'18, Harold F. Marshall'19, John R. Marvin,'02, Robert H. Meier, Jr.,'47, H. Felton Metcalf'22, Charles E. Miller'33, Lewis A. Miller'00, Robert K. Miller'29, V. G. Miskjian'29, Jack L. Mohr'47, Gilbert P. Monet'43, Marion G. Monet'43, Richard S. Mooney'47, Allan Q. Mowatt'35, George W. Muller, Jr.,'32, Charles R. Myers,2d, '23, John A. Myers'36, David M. Nason'33, Leroy C. Oberholtzer'47, John S. O'Conor '36, Carl F. Olson'41, A. Abba Orlinger'21, John C. O'Shea'45, William G. Osmun'40, Peter G. Park'40. William H. Peirce'46, Thomas D. Perry'00, Edwardes S. Petze '28, William W. Pleasants'33, William W. Pockman'45, Rene A. Pouchain'17, Oden B. Pyle, Jr.,'16, Frederick E. Ray'38. Robert W. Richardson'26, Frank W. Riddell'39, Owen W. Rideout'28, Roy G. Rincliffe'23, Robert E. Ritterhoff'46, C. Stanley Robinson'23, Wirt R. Robinson'18, George F. Rowell'92, John W. Sanborn'26, Herman Schaevitz'38, Carl A. Schafer'11, Robert D. Schmitt'45, Solomon Schneider '15, Malcolm L. Schoenberg'45, William L. Schubert'41, Edward W. Smith, Jr.,'42, Granville B. Smith'18, H. Sheldon Smith '31, Charles W. Stose'22, David E. Sunstein'40, Hobart L. Swan'44, John A. Sweeton'26, James S. Thornton'41, Charles H. Topping'28, Fred H. Travers'23, Howard J. Trombley'23, Helen F. Tucker '33, Robert J. Tullar'13, Lawrence S. Vadner'22, Edwin P. Van Sciver'42, Wesley J. Van Sciver'40, Hiram L. Walker'05, William J. Walsh'06, Robert W. Weeks'13, Charles B. Weiler'25, Edward A. Weissbach'16, Proctor Wetherill'34, Ray N. Wheelock'25, Edmund A. Whiting'15, George E. Whitwell'14, M. Arnold Wight, Jr.,'40, Frank B. Wilder'46, Herbert L. Woehling'12, Robert E. Worden'36, and Frank H. Worssam, Jr.,'47.

President Dimmick appointed the following Alumni to nominate candidates for the election of officers and executive committee members at the annual dinner meeting scheduled for January 18, 1949: George T. Logan'29, Chairman, Edward J. Healy'23, Henry W. Jones'26, Burkhart A. Kleinhofer'39, William H. Peirce'46, and Edmund A. Whiting'15. Bill Peirce '46 recently was appointed an Assistant Secretary of the Club. Bill initiated the first Club deep sea fishing expedition. His report follows: "Early last summer, a deep sea fishing trip was held by the Club to provide a more informal type of gathering than our regular dinner meetings. It was held out of Ocean City, N.J., on Saturday, June 5, and a total of 23 members of the Club and their guests were present. We arranged a car pool for transportation to Ocean City and left Philadelphia about 6:00 A.M. arriving in time to start out at 9:00 A.M. Our boat was about 50 feet, which gave plenty of room to everyone, and we went out about 5 or 6 miles before we started fishing. Unfortunately, there were not many fish to be had that day, and the weather wasn't the best. We tried several places but none seemed to have any fish. The fishing was bottom fishing with hand lines, and our catch consisted mainly of a few small sharks, nothing good for eating. We started in about 3:00 P.M. and got back to Ocean City at 4:00 P.M. with everybody glad to get back on solid ground again. During the trip, the 'fatalities' were about 50 per cent. The cost for the day was $5.75 per person and this included the beer, soft drinks, fishing equipment and bait. The names of those who went on the trip are as follows: Burton S. Angell'43, Luther C. Chien'47 and guest, Wiley F. Corl, Jr., '39, Robert G. Fisher'44, Deane R. Folsom'46, Aaron F. Hahn'45, Stephen P. Higgins, Jr.,'43, Lewis W. Hull'38 and guest, Kenneth V. Kratochvil'44, Charles E. Miller'33 and guest, Jack L. Mohr'47, William H. Peirce'46. Robert E. Ritterhoff '46, H. Sheldon Smith'31 and guest, William H. Wannamaker, Jr.,'30, C. H. Warshaw'47, Perry W. Wilder, Jr.,'44, and Milo V. Wilson, Jr.,'48."

The Philadelphia Alumni extend their deepest sympathy to Captain Garland Fulton'17 and Garland L. Fulton'48 on the loss of their wife and mother. — Funeral services for William S. Doughten, Jr.,'41, first lieutenant, who was killed at Gela, Sicily, on July 10, 1943, serving with the 83d Chemical Battalion participating with the American Rangers, were held July 28, the body having been repatriated from Gela. The memorial service was attended by club members Herbert W. Anderson'15, Henry S. Dimmick '22, and Samuel K. McCauley'41. Bill was the first man of the Class of 1941 to lose his life in the European invasion. He left an African base on a troop ship and volunteered to hit the Sicilian beach in a small landing craft with three other men for reconnaissance for mortars. Bill was in the second wave of troops, but he did not clear the beach. After graduating cum laude from the Haverford School, Lieutenant Doughten entered Technology and graduated in Course V. Bill was a member of Alpha Chi Sigma and of Delta Kappa Epsilon. His father is a vice-president of Stephen F. Whitman and Son, Inc. Surviving are his parents and a sister, Mrs. Henry B. Turner of Memphis, Tenn.

The annual dinner meeting of the Club will be held on Tuesday, January 18, 1949, in the ballroom of the Warwick Hotel, 17th and Locust Streets. We expect to have with us Dr. James R. Killian, Jr.,'26, President of the Institute. For information about Alumni in the Philadelphia area, call Boulevard 0287. — SAMUEL K. MCCAULEY '41, *Secretary*, 288 Copley Road, Upper Darby, Pa. *Assistant Secretaries*: WILEY F. CORL, JR.,'39, Box 358, Bryn Mawr, Pa.; WILLIAM H. PEIRCE'46, 532 East Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.

The M.I.T. Club of the Philippines

The Club held an election-luncheon meeting on September 19 at the Selecta Restaurant in Manila. Activities for the coming year were planned and the following officers were elected: President, Gregorio Y. Zara'26; Secretary-Treasurer, Ramon S. Sevilla'39; and Assistant Secretary-Treasurer, Ernesto B. Ledesma'23.

In his address to the members, Dr. Zara pledged all the talents in the Club to helping the government in carrying out its program of rehabilitating the industries of the country. Even now, several club members are directly helping the government in this program. Among them are the following: Cesar H. Concio'40, Capital City Planning Commission; Ernesto Ledesma '23, Import-Export Control Board; Luis H. Lim'42, National Airports Corporation; Jose B. Cortes'42, weather bureau; Jesus B. Perlas'40, Metropolitan Water District; M. S. Angeles'28, Insular Sugar Refining Corporation. — RAMON S. SEVILLA'39, *Secretary*, 2841 Taft Avenue Extension, Manila, Philippines.

M.I.T. Club of Rhode Island

Members of the M.I.T. Club of Fall River joined us for a clambake on September 24 at the Mount Hope estate of Rudolph F. Haffenreffer'95, President of the Fall River Club for the past 45 years. Governor John O. Pastore, James R. Killian, Jr.,'26, and H. E. Lobdell'17 were guests. Approximately 75 Alumni attended.

Frank J. Dunn, Jr.,'39 was named president to succeed Royal Sterling'23. Other officers include: Glenn D. Jackson, Jr.,'27, Vice-president; Eugene J. Brady, Jr.,'42, Secretary-Treasurer; J. Douglas Robertson'16 representative to the alumni council; John B. Waller'41 and William Barker '32, members of the club council. Albert J. Puschin'28 was chairman of the nominating committee. — EUGENE J. BRADY, JR., '42, *Secretary*, 41 Strathmore Road, Edgewood, R.I.

M.I.T. Club of Schenectady

The Club held a luncheon meeting, its first of the year, at the young women's Christian Association on October 14, and 26 members attended. Joe Quill'41, the new president, outlined the proposed meeting schedule for the year, which was well received by the group. It has been the feeling of many of the members that the Club should participate in civic affairs, with the idea not only of supporting and encouraging such activities, but also of keeping the Club active by offering its members a constructive program on which to work. In accordance with this feeling, it was arranged to have Harry J. Linton, superintendent of schools for the city of Schenectady, as the principal speaker at this meeting. He gave a very well-prepared presentation, including the proposed 1949 budget for the local school system, and listed the four major items of expense as teachers' salaries, materials and supplies, furniture and instructional equipment, and improvement and repair of buildings and grounds. In addition, like most other cities, our present school facilities are inadequate, and Dr. Linton described the progress being made toward building a new high school. A considerable amount of interest in the local school system was aroused by the speaker, and a special committee was formed, with Bob Brown'43 as chairman, to study the problems involved and to represent the Club at the forthcoming public hearings on the budget. We look forward to the report on this meeting with a great deal of interest.

Present at the meeting were: R. C. Robinson'01, Andrew Vogel'13, V. Y. Dunbar'16, E. H. Bancker'18, H. W. Bibber'20, G. T. Bevan'31, L. H. Dee'35, R. W. Newman'36, L. G. Peterson'36, V. G. Lippitt '38, Shepard Roberts'38, D. C. Jackson, 3d,'40, I. W. Collins'41, J. A. Kohn'41, J. S. Quill'41, A. W. Robinson'41, R. W. Stanhouse'41, R. W. Austin'42, H. R. Brown, Jr.,'43, R. M. Ilfeld'44, W. B. Rodeman'44, E. S. Lawrence'47, G. H. Oliver, Jr.,'47, A. M. Varener'47, M. L. Vogel'47, and Francis Brown, Jr.,'48. — IVOR W. COLLINS'41, *Secretary*, General Electric Company, Building 56–201, 1 River Road, Schenectady 5, N.Y.

M.I.T. Club of Southern Texas

We lost one of our Alumni in a tragic air accident near New Orleans on September 17. Samuel E. Lambert, Jr.,'32, of the engineering department of Shell Oil Company, Inc., in Houston, was making a routine flight with five others of the Coast Guard Air Reserve unit. They had trouble with one of the two motors while flying in fog close to their destination, and while searching for the landing field the other motor failed, resulting in a crash that was fatal to all. Captain Lambert leaves a widow and two children. His home address was 7503 Satsuma Street, Houston, Texas.

Irwin W. Alcorn'23, has been highly honored in being made chairman of the petroleum division of the American Institute of Mining and Metallurgical Engineers. He heads the petroleum engineering department of the Pure Oil Company of Houston. We all wish him continued success. — JOSEPH H. MCEVOY'21, *Secretary*, 202 McGowen Avenue, Houston 6, Texas.

Washington Society of the M.I.T.

The Society opened its season on October 6, 1948, with a dinner meeting at Barker Hall in Washington. Our President, Al Beitzell'28, announced that the first Wednesday of the month would generally be our meeting nights. He also reminded the members of the election last spring by introducing the current management of the Society. The officers are: President, Albert E. Beitzell'28; First Vice-president, Robert K. Thulman'22; Second Vice-president, George D. Mock'28; Secretary, John A. Plugge'29; Assistant Secretary, Nicholas P. Stathis'29; Assistant Secretary for Women, Mary O. Soroka'26; Review Secretary, Albert F. Bird'30; Treasurer, Jose U. Jovellanos'43; Executive Committee, Raymond A. Frigon'41, Julius A. Furer'05, Frederick W. Turnbull'30; John A. Mathews'39, Proctor L. Dougherty'97.

Television proved to be a lively after-dinner subject. Mel Glascock, Yale'30, covered a number of business phases of the subject from television stars to insurance policies on new sets. Now in its infancy and growing rapidly, television has problems. One is how to make money when the stations now spend ten dollars for every dollar paid by sponsors; another, now no longer disturbing to WNBW, National Broadcasting Company in Washington where Mel Glascock is an executive, was leaves on the trees, which shut off a telecast of a local horse race last year. Notwithstanding the present progress made on the co-axial cable now being pushed westward, Mr. Glascock anticipates better results from the wave guide approach to the transmission of telecasts between the event and the studio. Potentially the best method, the wave guide is now in the laboratory stage of development and will follow the co-axial cable by some years. Some persons fear that television will tend to decrease attendance at sporting events and other spectacles, particularly movies, if the event is telecast. The speaker does not hold this view, asserting that telecasts of baseball have stimulated people who had never seen a professional game to the point of becoming regular fans, actually swelling attendance at the games.

"Increasing attention is being given to improving the quality of television programs," said Mr. Glascock. Dramatic, discussion and educational programs are being developed for presentation this winter which will raise materially the general tone of the offerings. Television and the movie industry – that is a subject that Mr. Glascock termed difficult. The feature-length picture is too long for optimum telecasting. Best lengths for this medium are about 45 minutes. Thus, even if motion picture producers would permit their wares to be telecast, certain revisions in the films would be attempted by the television studios to fit the motion picture to the television requirements. Efforts are continually being made to find a way to telecast good movies. Mr. Glascock is confident that the way will be found. Upon a raising of hands, we learned that only three men present owned a television set. Mr. Glascock mentioned that many people are deferring purchase pending technical improvements, but progress will continue in the perfection of television, so that one point is certain, the best television outfit you will ever own is the one bought last before you die.

Present were: 1889: G. W. Stone; 1890: J. G. Crane; 1897: P. L. Dougherty, F. A. Hunnewell; 1900: H. C. Morris; 1904: A. M. Holcombe, G. H. Shaw; 1905: J. A. Furer, E. F. Kriegsman; 1906: W. P. Terrell; 1911: W. H. Martin; 1915: A. D. Beidelman; 1916: V. L. Ellicott, F. P. Upton; 1917: H. M. Baxter; 1918: A. F. Murray, F. H. Copeland; 1919: M. P. Smith, L. J. Grayson; 1920: John Nolen, Jr.; 1921: Richard McKay, C. F. Baish, L. W. Conant; 1923: L. K. Downing; 1924: J. E. Jackson, W. D. Rowe; 1925: Ralph Ilsley; 1926: J. G. Fletcher, A. S. Heyser, M. O. Soroka; 1927: F. E. Glantzberg; 1928: A. E. Beitzell; 1929: J. E. Howarth, Jr., N. P. Stathis, J. A. Plugge; 1930: A. F. Bird, J. A. Mathews; 1931: J. F. Gamber, H. D. Randall; 1932: R. W. West, F. M. Moss; 1936: S. C. Rethorst; 1937: D. L. Gundry; 1940: W. G. Peck; 1941: M. J. Block; 1942: William Hahn; 1944: F. S. Pohanka, Jr. — ALBERT F. BIRD'30, *Review Secretary*, 5070 Temple Hills Road, Southeast, Washington 20, D.C.

CLASS NOTES

• 1888 •

Marion Talbot, a distinguished member of the Class, died on October 20 at her home in Chicago at the age of 90 years. Miss Talbot devoted much of her life to problems in sanitary science and household administration. She was professor emeritus of Household Administration at the University of Chicago at the time of her death. But more outstanding than these technical efforts was her direction of this country's first large-scale development of co-education at college level. Appointed by Dr. William Rainey Harper in 1892, four years after her graduation from Technology, as the first dean of women, she had the delicate problem of handling mixed classes of men and women in a new university in a new city in such a way that there would be no scandal or criticism. On taking her position in Chicago, her friends, she wrote, gave her a piece of Plymouth Rock "to give her strength as she departed for the shifting and perilous sands out there on the edge of the prairie."

Previous to her M.I.T. attendance where she obtained her S.B. degree, she studied at Boston University, receiving in 1882, her M.A. degree. Following graduation from the Institute she was an instructor at LaSalle Seminary and then at Wellesley College. Following her retirement from the University of Chicago in 1927 she served for two separate years as acting president of the Constantinople College for Women, 1927–1928, and 1931–1932. She was a founder of the American As-

sociation of University Women about 1890, a charter fellow of the American Public Health Association, honorary member of many other associations and member of still others. She was author or co-author of *Home Sanitation,* 1887; *Education of Women,* 1910; *The Modern Household,* 1912; *House Sanitation,* 1912; *History of the American Association of University Women,* 1931. Her best book, according to her friend, Lonsdale Green'87, is autobiographical, *More Than Lore.* Mr. Green lived near her and knew her personally for many years. He says she always was interested in and asked about Technology affairs when she met him while taking her constitutional walk with a woman companion. — BERTRAND R. T. COLLINS, *Secretary,* 291 Nassau Street, Princeton, N.J. SANFORD E. THOMPSON, *Assistant Secretary,* The Thompson and Lichtner Company, Inc., Park Square Building, Boston 16, Mass.

• 1890 •

Our classmate, Sidney Horton, and the E. Horton and Son Co. which came under his management in 1912, is the subject of a very interesting recent article in the Hartford, Conn., *Daily Courant.* We have not seen him since our 55th reunion but he is referred to as a "white-haired industrialist of the old school — who had an individual pride in the making of the Horton chucks," invented by Eli Horton in 1851, "the first really workable chuck made." It is a pleasure to read of a company which "has always been a source of pride to local workmen who have been employed there as skilled mechanics for generations." Under Sidney's management the company "greatly expanded all lines of Horton chucks," and increased the "floor space for manufacturing purposes to 35,000 sq. ft. The Company has always had an extensive foreign trade and during the first World War made large quantities of chucks for the English Government."

In our last notes we referred to the presentation of the Julius Friedenwald Medal to Franklin White. The following from *Gastroenterology* for July, 1948, is the introductory portion of this presentation address: "Before commenting upon Franklin White's interesting biography and his 80 published contributions to internal medicine and gastroenterology, I should like, first, to refer to him as the friend and colleague whom we have known in this Association. In retrospect, we all have a most pleasant memory of the role he has played in our deliberations. His keen intellect and fine critical sense, his progressive spirit and numerous, stimulating contributions to our meetings and to the literature, his consideration for the feelings of others, the twinkle in his eye and his keen sense of humor have made him not only one of our most eminent members but also an outstanding personal favorite among us. For him we have the greatest respect, admiration and affection." This number contains an excellent picture of Frank which we are pleased to add to our far too small collection of '90 photographs, 50 plus years after.

From Harry Goodwin we have a copy of *Science* for September 10, 1948, the cover of which, as he writes, shows "the unveiling of Whitney's portrait at the 'Whitney Day Ceremony' on August 21 at the new research laboratory of the General Electric Company in honor of his 80th birthday." Harry also writes: "At the dedication of the Mount Palomar Observatory, the 200-inch telescope was definitely named the 'Hale' telescope. The United States Government has issued a new three-cent stamp to commemorate the event."

Notice has just been received of the death in 1947 of Edward M. Beals, a special student in Course IX. We have no biographical information.

Please note the Assistant Secretary's change of address. — GEORGE A. PACKARD, *Secretary,* Room 514, 53 State Street, Boston 9, Mass. HARRY M. GOODWIN, *Assistant Secretary,* Room 5–213, M.I.T., Cambridge 39, Mass.

• 1894 •

Another Alumni Day has come and gone with the usual high success and interest. At the luncheon, Billy King, Ed Hunt and your Secretary represented the Class and at the banquet in the evening we were joined by Norwin Bean and Walter Batson. Next year we shall go out in a big way to get the Class together for Alumni Day and for our 55th anniversary reunion in which interest is being awakened. Better count on it, fellows. Arthur Shurcliff has promised a poem for the occasion. Jack Nowell wrote the Secretary that he and his wife were leaving California to visit their daughters in the Boston area; his first objective point being Bass Rocks, Gloucester. He promised a call on the Secretary, which up to this writing has not eventuated although the Secretary has been at the Institute practically every day during the summer. Maybe it isn't too late. An explanation will be sought when the Secretary goes to San Francisco in February.

Members of the Class will be pleased to know that a portrait of Ray Price is being painted by H. Bingham Ballou, Jr., an artist of unusual skill and ability whose work is already displayed at the Institute in a portrait of your Secretary, given by the Class, and one of Professor Robert S. Williams, retired Head of the Department of Metallurgy, given by staff associates and former students. Both of these portraits have received high praise for excellence of likeness and remarkable technique. It is possible (and hoped) that the Price portrait may also be given to the Institute by Mrs. Price.

A recent call from Theodore Horton gave the Secretary a most enjoyable morning, comparing our views on various matters pertaining to public health and private welfare, and recalling the events and the associates of our days at Technology and in the professional activities in which we have both participated since that long-ago time. Upon his retirement from the post of chief sanitary engineer, New York State Department of Public Works, Horton took up his residence in Sandwich on Cape Cod, where he has been as active in public affairs as his physical condition would permit, and where he and Mrs. Horton have found great pleasure in their local contacts and the occupations relating to flower gardening. Any '94 man visiting the Cape would find a cordial welcome if he should give them a call. Another Cape resident of the retired class is Arthur Patrick in Centerville, who is also active in the public-spirited organizations of Hyannis and its environs. The Secretary is grateful to A. Fisher'05 for a clipping from a Richmond, Va., paper of October 22 which records the honor that has come to Harold M. Chase in receiving the Olney Award for 1948 for outstanding achievements and contributions in the textile industry. The award was made by the American Association of Textile Chemists and Colorists, of which Chase is a charter member. A meeting of this association was recently held in Augusta, Ga. The medal, which bears the likeness of Louis A. Olney, former president of the Lowell Textile School, and first president of the association making the award, was presented on October 21. Its purposes are to encourage and afford public recognition of outstanding service to the textile industry. Chase, one of our most able graduates, went to North Carolina shortly after leaving Technology, and in 1917 became associated with the Dan River Mills at Danville, Va., as chemist, and became the research director of this most enterprising company in 1937. His contributions to textile chemistry have been too numerous to record here, and include many patents relating to dyeing processes and the development of the "wrinkle shed" treatment to make fabrics wrinkle resistant and water repellent. Congratulations, Chasey, from all your classmates for whom the Secretary is glad to be spokesman. Alan Claflin, a lifelong friend of the medalist was present at the ceremonies, and doubtless did the honors for the Class in his usual effective and urbane manner.

Jim Kimberly has returned from his summer home in Wisconsin to his residence at Tryon, N.C. His address is Box 277. Walter Brown reported that he has left Belfast, Maine, where he spent the summer, and will now be living at 135 East Amelia Avenue, Orlando, Fla., presumably for the winter.

A very much belated notice was received by the Alumni Office that Preston H. Haskell, who was with us in our freshman year, died in 1931. No details of his life since 1890 are known to us. It is also the sad duty of the Secretary to report the death of Francis C. Green, which occurred at the Home for Aged Couples in Roxbury on August 17. Green was prominent in our Class in its early years but became a five-year student and graduated with the Class of '95. He was a nephew of Mrs. William Barton Rogers and lived at her home during his student days. He was a member of the Number 6 Club, and other student organizations. After his graduation he held various positions in New York, Philadelphia and elsewhere. At one time he was employed by the Singer Sewing Machine Company. For the past several years he had lived in Washington. He was obliged to relinquish a government position because of a stroke by which he was physically incapacitated but from which he partially recovered. Being un-

able to work, however, he and his wife made arrangements to enter the Home for Aged Couples, and had hardly arrived there before he had another stroke which resulted in his death in a very few days. He left a widow, Mrs. Mary B. Green.

In the July Review brief mention was made of the death on May 29 of William H. Pratt, who for 44 years was an electrical engineer with the General Electric Company at the West Lynn Works, eventually becoming chief cunsulting engineer there. His service to that company was outstanding, and he was regarded as a pioneer in electrical measurements and an authority on meter design and manufacture. He designed the first induction meter manufactured by the company and during his career invented and had assigned to the company more than 100 patents on meter types. His interests were broad and transcended the engineering field, although it was here that his international reputation was made. He was a delegate to the International Electrotechnical Congress in 1930. In 1932 he presented the United States contribution on meters, demand indicators and instrument transformers at the Electrical Congress in Paris presenting his paper in the French language. He was the first New Englander to receive an award from the Engineering Society of New England in 1941. He was a member of the Bond Astronomical Society of Cambridge, a Fellow of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, the Lynn Institute of Electrical Engineers and the National Section, Thomson Quarter Century Club. His desire always to be of service is shown by his constant work at the Research Corporation and Radiation Laboratory in Cambridge during the war period. Always modest and friendly, he was held in highest esteem by classmates and professional associates, and by a large circle of friends. He was unquestionably one of the most illustrious members of our Class.

Another of our classmates whose whole active career was with the General Electric Company, Samuel Henry Blake, died in Schenectady August 24. Entering the employ of this company as a young assistant engineer soon after our graduation in 1894, he rose through various steps to positions of responsibility in the company. As he never replied to class letters the Secretary regrets that he can give little definite information regarding the career or family of one of our classmates who was well known and active in undergraduate affairs during our student days. — SAMUEL C. PRESCOTT, *Secretary,* Room 5–213, M.I.T., Cambridge 39, Mass.

• 1895 •

The Class of 1895 begs to express to the Class of 1896 its deepest sympathy in the loss of their esteemed Class Secretary, Charles E. Locke. While one of his great interests was centered in the Class of 1896, he always kept a fatherly eye on all of the classes of the Association, and when asked for, his counsel and advice were freely given. 1896 will miss him most!

It is not too early to think of and plan for the 55th reunion of our Class. Your Secretary contemplates mailing a questionnaire in the spring of 1949, to learn who may be the weak and the strong in their desire to get together again during June, 1950. Those who will be fortunate to attend this notable gathering of oldsters will have the opportunity to participate in the reminiscences of a lifetime. William B. Stork has returned to Baltimore, Md., and you can reach him at 417 Hawthorne Road. It would be interesting reading if we could get a copy of the New Year resolutions of every member of the Class. Send yours along and give us some news. — LUTHER K. YODER, *Secretary,* 69 Pleasant Street, Ayer, Mass.

• 1896 •

Charles E. Locke was buried on September 27 in the family lot at Rye Center, N.H., following the public service which was held in the Leyden Congregational Church in Brookline. Belle and I motored to Rye and felt honored to represent the Class at the commital services. There had been a request for no flowers but slight regard was given to this appeal and, of course, '96 was well represented among the beautiful floral displays. Charlie's home in Rye is to go to the Institute, and so the final chapter to a loyal alumnus who did so much for so many is closed. Letters concerning the passing of Charlie have been received from: Paul Litchfield, Louis Freedman, Marshall Leighton, William Clifford, Mrs. Helen Chamberlain Dodd, H. H. Tozier, Dan Bates, John E. Eynon, Charlie Tucker, Will Coolidge and Conrad H. Young.

The following is an excerpt from the Resolutions submitted by Horace S. Ford, Walter Humphreys'97, Henry E. Worcester'97, Ralph T. Jope'28, and John A. Rockwell, chairman, and passed by the Alumni Council at its October 28th meeting: "As a teacher and member of the Institute's staff for forty years, he will long be remembered by associates and students alike for his thoroughness and sense of responsibility in the handling of all tasks. As a mining engineer and author, he was well known and highly regarded for his many contributions in methods of processing ores. As Secretary of the Alumni Association from 1930 to 1948, and, particularly, as Secretary of this Council, he has earned the gratitude and appreciation of each and every member by conducting his work faithfully, efficiently, and pleasantly. As Secretary of the Class of 1896 from 1908 to 1948, he was known and loved by all. As members of this Alumni Council, we join in sincere tribute to his memory, in appreciation of his years of faithful and fruitful work, and in the expression of our deep sympathy for the members of his family."

I now inherit the duty of Secretary and Treasurer. I shall hope to continue the high standards set by our efficient classmate. For such results, may I ask your co-operation in supplying me with communications and class news. Charlie's record in supplying this information was outstanding and I believe I am correct in saying he never missed an issue and 1896 was always represented in the notes which we have learned to look forward to these many years.

Word has been received of the death of J. Lloyd Wayne on October 10. He is survived by a sister, Mrs. J. Y. Anderson of Cleveland, Ohio, and three nephews. — The correct mailing address for Conrad Young is Post Office Box 223, Bass River, Mass., not St. Petersburg, Fla., as listed in the 1948 Alumni Register. Con informs us that Cape Cod has been his permanent address for the past 20 years, and that the St. Petersburg address is merely temporary, all mail being forwarded from Bass River. — JOHN A. ROCKWELL, *Secretary,* 24 Garden Street, Cambridge 38, Mass.

• 1899 •

A study of the new Alumni Register reveals some interesting figures regarding the class of 1899. There are now, at this writing, 183 members living and 181 deceased. Since the 50th anniversary of our commencement comes next June, these figures would appear to indicate that our Class has maintained a very fair average for longevity. However, Father Time is bound to take his toll as the years roll by; so plan to attend the 50th reunion celebration and get-together next June. There are big times a-planning. Watch this column for details. You are still young enough, most of you, to enjoy such an outing.

Geographically our classmates are located in the following states: California 12, Connecticut 7, Colorado 3, Delaware 1, Florida 5, Georgia 2, Illinois 4, Indiana 2, Iowa 1, Kentucky 1, Maryland 4, Maine 8, Massachusetts 55, Minnesota 1, Michigan 2, Missouri 1, New Hampshire 9, New Jersey 8, New York 26, Ohio 4, Oklahoma 1, Pennsylvania 4, Rhode Island 2, Texas 1, Wisconsin 3, Vermont 3, Virginia 2, the District of Columbia 6, Cuba 2, and England 1.

Who will get the prize for coming the longest distance? Who is the oldest? The youngest? The one with the most grandchildren? Send in nominations and ask questions you would like to have answered. — BURT R. RICKARDS, *Secretary,* 381 State Street, Albany, N.Y.

• 1900 •

Stanley Fitch sent the following note: "While I was at Rockywold Camp, Holderness, N. H., the latter part of August, I was agreeably surprised to see Marcy Sperry walk into the dining room. We had a pleasant chat and among other things he mentioned that he and Harry Grant see a great deal of each other in Washington, D.C. After leaving Rockywold, I passed through various points on Cape Cod and on the way home dropped in to see Louis Crowell at his home in East Dennis. He and his two daughters, Gida and Lydia, greeted me with their old-time hospitality, and I was delighted to find that Louis has shown a remarkable recovery since I saw him last, some months ago."

George B. Moody, XIII, writes from his home, Box 423, in Portsmouth, N.H.: "I am now retired and have no family except a sister in Palo Alto, Calif. My only claim to notice is that my roommate at Technology was Carleton Ellis, probably the most distinguished and successful member of our Class and as fine a man in every way

as has ever been produced in this country. After leaving the Institute I spent 44 years in the shipbuilding industry, mostly in the drafting room at the plants of the Newport News Shipbuilding Company, the Bath Iron Works and the Portsmouth Navy Yard. This work covered the mathematical and technical work involved in submarine design, which is a complicated subject probably as difficult as any in the whole engineering field. During my lifetime I managed one invention while my famous chum, Carleton, developed over 850 patents. I am very fond of travel and the greatest pleasure I got out of life was in running a 33-foot cabin cruiser around the beautiful coast of Maine from Portland to Bar Harbor. It was a splendid boat, all mahogany topside, fitted with a Sterling engine, strong and able, and when one dropped the anchor one had all the comfort and convenience of the Waldorf Astoria. When I grew older and became a landlubber I enjoyed driving an automobile. I have bought eight so far, driving around 500,000 miles, including four Reos, two Packards, one Oldsmobile and one Ford. There are many beautiful drives adjacent to this fine residential city of Portsmouth and I have enjoyed them all. But the tops of everything to my mind is the trans-continental drive to California. Driving through all the states in our wonderful country and seeing all the different types of people and housing is an exhilerating experience of which one never tires. While living in Bath I was for a period of years commodore of the Kennebec Yacht Club and a lieutenant in the Coast Artillery National Guard, all of which was a great deal of fun.

"Now that I am retired, my principal occupation is taking it easy, with special attention to staying outdoors in the sunshine. I spend most of my summers at a cottage on MacMahan's Island in the Boothbay Harbor region, the worlds handsomest cruising ground and, when lucky, spend the winter near San Francisco, the most fascinating city in our country. I have enjoyed life all the way through, although it has dealt me some hard knocks, and I hope to live to be one of the oldest members of the Class of 1900."

From Harold L. Morgan, VI, 60 Woodside Avenue, Waterbury 61, Conn., comes the following: "I have been bedridden since March, due to a special operation. I am getting so I can use an exerciser and expect to be on deck again by Thanksgiving. For 25 years I was structural and architectural engineer for the Connecticut Light and Power Company, but retired three years ago, four years later than the company rule of retirement at 65. Since then I have done consulting on general structural problems. I have lived for 34 years here at 60 Woodside Avenue but have just bought a home in Darien, Conn., to be near my son and grandchildren. Will send you my new address when I move — I hope in about a month. My son married Olga Davis of Dorchester, Mass., after graduating from Harvard. He is now a junior executive with the American Broadcasting Network. He is in charge of budgeting investments and television. He has three children; two girls, four and twelve, and a boy, eight. They are members of the Noraton Yacht Club and spend much time with sail boats, racing and fishing. They also belong to a uniformed riding academy. We are all proud of our children and grandchildren and Mrs. Morgan and I are no exception to the rule. For 35 years we have owned a summer home on Plum Island, Newburyport, Mass., so in traveling to and from have often gone through your town, and many times I go through Brookline to Route 1, so as to go by the Institute buildings and see the boats on the Charles."

Next time you pass by, Harold, I hope you will call. And this applies to any 1900 men passing this way. We need many more good letters like those above. If you enjoy reading these why don't you give others pleasure by writing to me for these notes. And by the way, are you giving some thought to planning for our 50th anniversary reunion in 1950? It isn't too far away to begin to think about it. — ELBERT G. ALLEN, *Secretary*, 54 Bonad Road, West Newton 65, Mass.

• 1902 •

Your Secretary has to report the death of our classmate, Jesse J. Eames, who retired from the Institute's faculty in 1945. The following is taken from the Boston *Herald* of October 15: "Center Ossipee, N.H., . . . Jesse J. Eames, 68, emeritus associate professor of mechanical engineering at . . . Technology, died . . . [October 14] at his home here where he had been living since his retirement in 1945. Born in Framingham, Mass., he was graduated from the Institute in 1902. He held various posts in industry until 1910 when he was appointed an assistant in the department of mechanical engineering. He was promoted to instructor in 1911 and became an assistant professor of experimental engineering in 1920. He was named an associate professor of mechanical engineering in 1934.

"In addition to his Institute teaching, he was an instructor at the Lowell Institute School from 1911 until his retirement. He was a member of the American Association of Mechanical Engineers. He leaves his wife and a sister, Mrs. Samuel B. Jackson of Reading, Mass." — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston 16, Mass.

• 1904 •

The small group of '04 men who attended the alumni dinner in June agreed that we ought to have a full-scale reunion next June. This will be our 45th anniversary and should be a dress rehearsal for our 50th, which will be here all too soon. Tentative reservations at East Bay Lodge have been made for June 24 to 26. This is later than Alumni Day but corresponds with the time of our earlier class reunions. You will receive further information as plans develop but in the meantime make a note of the dates and plan to attend. If you have any suggestions or any objections to the time and place please let us have them at once.

Another retirement has been reported. This time it is Charlie Boggs who was general superintendent of the big copper smelter at Noranda, Quebec. Charlie acquired an enviable reputation in this job and made some notable contributions to copper smelting practice. Harry Groves who resides in the Nation's Capital paid a visit to Boston in the summer but didn't find us in. Try again, Harry. Phil Sweetser also came to Boston and made some calls.

We regret to report the death of three more classmates: Arthur R. Holbrook on August 2, Selby Haar on September 5 and Charles F. Barrett, on September 14. No details are available regarding Haar but we have the following items regarding Holbrook and Barrett.

Arthur R. Holbrook was born on April 19, 1882. He graduated from Ashland High School, attended Dartmouth for two years, then transferred to the Institute where he graduated in the Course in Civil Engineering. His professional career was as follows: 1905, Assistant at Technology and several short assignments; 1906–1920, Board of Water Supply, New York City; 1914–1920, Instructor in Civil Engineering, Brooklyn Polytechnic Institute evening school; 1920-1925, Engineer Water Works Extension, Columbus, Ohio; 1923–1933, Fuller and Maitland, New York; 1934–1936, Public Works Office, Third Naval District; 1936 to date, Tennessee Valley Authority. He was married on October 5, 1909 at Grafton, Mass. He is survived by his wife, Edith G. Holbrook, and daughter, Dorothy (Mrs. Carl B. Allendoefer) of Bryn Mawr, Penn., three grandsons, and a sister, Mrs. Robert Phelps of Ashland, Mass. He was a member of the American Society of Civil Engineers and a licensed engineer in New York State. Arthur was rated by his employers on his various jobs as above average in personality, co-operativeness and ability, and was highly respected by his fellow workers. His work was his chief hobby, and walking and automobile trips were his principal recreation. He was an early riser and liked to get to his desk long before the usual opening hour and prolonged the day if there was a pressure of work still to be done. Until poor health prevented, he was a regular attendant at engineering meetings. He and his wife became members of the Presbyterian Church in Kansas City, Mo., and in Knoxville they were regular attendants at the Second Presbyterian Church.

Charles F. Barrett was born in Somerville, Mass., in 1880 and later lived in Belmont. At the time of his death he resided in Springfield, Mass. He was a sales engineer for Standard Electric Times. For many years he was active in automobile circles and was associated at various times with Locomobile, Knox, Pope and Hartford and Electric Vehicle Company. He was a member of the Automobile Old Timer's, Inc. He leaves two sons, Franklin W. Barrett of Springfield, and Charles F. Barrett, Jr., of Schenectady, N.Y.; one sister, Miss Alice G. Barrett, former Belmont school teacher; and four grandchildren. — EUGENE H. RUSSELL, JR., 82 Devonshire Street, Boston 9, Mass. CARLE R. HAYWARD, Room 8–109, MIT., Cambridge 39, Mass.

• 1905 •

Due to a misunderstanding as to the due date for class notes for November, no 1905

news appeared in that issue. However, a condensation of these notes was mailed in late October to all '05 men on the subscription list. In the belief that we did not have all the names (life members, and so forth) I am duplicating a few things here, principally vital statistics. The 1948 get-together at Osterville, Mass., in June was a huge success, socially at least, and it was again agreed to repeat on June 17, 18 and 19, 1949. Wallace MacBriar, Harry Nabstedt, Tom Estabrook, and Arthur Russell have retired from business. The deaths of Horace Macintire, Ralph Tarbett, Russell Willson, Herman Holz and Zenas Staples were recorded.

This month we have to inform you of the death on August 13 of Ellis G. Wood at his summer home in West Rindge, N.H. His home town paper, the Arlington, Mass., *Advocate*, gives this information: "Mr. Wood attended Arlington schools and M.I.T. While in high school he made up a famous baseball battery with his brother, the late Harold B. Wood. He was connected with the William T. Wood Ice Tool Mfg. Co. of Arlington and went with the company to Hudson, N.Y., when it merged and became the Gifford-Wood Co. Mr. Wood was a member of the First Baptist Church while living with his family on Massachusetts Avenue, Arlington. Besides his wife Ora Blair Wood of Rindge, N.H., he is survived by his daughter, Mrs. Ernest R. Woodfin of Katonah, N.Y.; two sisters, Mrs. Dunbar F. Carpenter and Mrs. James Nowell of Winchester; three brothers; Mr. John F. Wood, Mr. William T. Wood, both of New York, and Mr. Oliver W. Wood of Norwood, and three grandchildren."

Sorry I missed a letter from our class Rector, Sid Caine, for he took the trouble to write in considerable length in regard to his inability to attend reunions. Sunday is apparently a busy day for a minister for his letter was written just after his first morning service at 6:30. Sid was, however, planning to attend the 47th reunion of his class at the University of Louisville, Kentucky. Sid says: "As to playing golf, I'm really quite broad-minded and wouldn't mind others smacking a small ball as an excuse for walking for I put in five to ten miles a day in parish calling." — Fred W. Goldthwait, *Secretary*, 274 Franklin Street, Boston 10, Mass. Sidney T. Strickland, *Assistant Secretary*, 69 Newbury Street, Boston 16, Mass.

• 1906 •

We have had occasion to refer to the Bell System retirement plan as it has affected a number of our classmates. Your humble scribe entered his furlough previous to retirement on July 9, 1948, exactly 42 years after entering the employ of the New England Company in Boston. Some of our classmates who are in the Company attended the farewell dinner which was held on July 8; among them being Henry Darling and Frank Benham. Frank, it will be recalled, retired in February, 1947. Our classmate Fred Batchelder, who was also with the New England Company retired early this year. The Secretary called on Fred one afternoon this September and enjoyed a very pleasant visit at his attractive home near the ocean at Hampton, N.H. If readers will pardon the personal allusion, your Secretary advised his friends that he anticipated retirement with "mingled emotions," feeling that time might possibly hang heavily on his hands, without any regular vocation. So far, it has been one continuous vacation and the idea of having every day a holiday has not worked out too badly. Golfers in the Class will be interested to know that Frank Benham and myself belong to the same country club and have had numerous rounds of golf this summer. On September 3, we made up a foursome including George Guernsey, who lives in Wellesley and has been playing golf only the last 12 or 13 years. George has done remarkably well at the game and gave us a lesson as to how we should play our course. This is intended particularly for Allyn Taylor's benefit as he may have a real battle on his hands for the class championship at the next reunion. A few weeks ago the Secretary had the pleasure of playing with George on his home course at Wellesley and spent a most enjoyable afternoon. George is the treasurer of the Dana Hall School for girls located in that college town.

Apropos of retirement, the Secretary recently received the following letter from Herbert Dean who has been with the Bell Telephone Company of Pennsylvania in Philadelphia since he left the Institute: "The American Telephone and Telegraph Company's bulletin reports that the automatic retirement rule is overtaking you. It seems such a short time since you started in New England Telephone, and I went afield to the Bell of Pennsylvania. I hope your career has yielded the satisfactions that you sought and that you have health and peace of mind. May the years ahead bring you happiness and serenity. My own retirement is on December 1. My domicile will be in Branford, Conn." As a result of the Secretary's retirement the address of the Class Secretary is his home address, 215 Crosby Street, Arlington 74, Mass. This indicates that, unlike Herbert Dean, the Secretary plans to make no change in his residence for the present.

Under date of July 20, the following was received from the late Charlie Locke: "Ray J. Barber reports that after two years of looking, he and Mrs. Barber have found an apartment only one mile from his office in the Engineering Building of the University of Southern California in Los Angeles. Ultimately they are hoping to get a separate house, and there seems to be some prospect of it with the continuation of new building in Los Angeles which is easing the housing shortage considerably and causing prices to drop. Last winter he had quite a serious illness with a heart attack and pneumonia, but is now back to his usual health. He taught in the summer session at the University of Southern California until July 24 and then had a mine examination job in Siskiyou County, Calif. After that he and Mrs. Barber had a cottage on the Hoover ranch near Santa Cruz, Calif., until September 4, when he had to be back at the school for registration. His new address is 1140 West 27th Street, Los Angeles 7, Calif."

We have acknowledged Charlie Locke's assistance on numerous occasions in the past and it was a distinct shock to hear that he had passed away a short time ago. Classmates may recall he was an 1896 man, or 10 years our senior. I am sure if the members of 1906 could keep up the same enthusiasm and interest in life which Charlie Locke demonstrated, we could look forward to the next ten years with pleasant anticipations.

A June wedding interfered with the Secretary's attendance at the annual Alumni Day held on June 12. The Class was represented by the Assistant Secretary and four other faithful members, namely: Bill Abbott, George Henderson, Henry Ginsburg and Abe Sherman. — James W. Kidder, *Secretary*, 215 Crosby Street, Arlington 74, Mass. Edward B. Rowe, *Assistant Secretary*, 11 Cushing Road, Wellesley Hills 82, Mass.

• 1907 •

The relatively small amount of news regarding classmates that I am able to give you in this issue is secured chiefly from the 1948 Alumni Register. J. W. G. Hanford, a graduate in Mechanical Engineering, is now retired, his home address is 143 South Street, Andrews Place, Los Angeles 4, Calif. William F. Kimball is a designing draftsman at Raytheon Manufacturing Company in Waltham, Mass., his home being at 19 Balcarres Road, West Newton Mass. Rudolf H. Kudlich is now superintendent of laboratories for the United States Bureau of Mines at College Park, Md. Dan A. Loomis, who for many years has carried on a real estate business in Springfield, Mass., has retired and is living at 14 Riverview Terrace in Springfield. Byron P. Luce is representative for Colombia, South America, of Honolulu Iron Works Company at 165 Broadway, New York City. Albert P. Mansfield, who took the Course in Electrical Engineering at the Institute, is an engineer specializing in textile applications of electrical equipment with General Electric Company at Schenectady, N.Y. Herbert A. Sullwold is an engineer with Hughes Aircraft Company, Florence and Teale Streets, Culver City, Calif.

Ernest A. Miner, who for many years has been located in Cleveland, Fla., is now at 11 Hillside Park, Malden 48, Mass. Ernest wrote me a long interesting letter of September 25, in which he said that since the middle of last July, he has been living in the 110-year-old house which belonged to his grandfather. It seems that a tenant who had been occupying this house was going to move, and Ernest went to Malden to personally supervise the necessary repairs and to size up the general situation. He plans to return to Florida, however, before the end of 1948. He originally built a 10 foot by 14 foot camp in Cleveland, Fla., which apparently is quite removed from closely settled districts, but has made additions to it so that two people can comfortably live in it. He has guava, citrus and mango trees on his property that he planted from seed and are now bearing fruit. He says that last year his place was struck twice by hurricanes, about one week apart, during which a stick holding a large door to his shed gave way, with the result that the roof was entirely blown off. He further states that "due to Course I knowledge, the house

stood intact." When he left his camp late last May, there were truck loads of oranges all ready to be picked in his neighbor's orchard, and canners were paying only about 15 cents a box for oranges. He writes that his camp is located 103 miles south of Tampa on the Gulf Coast, outside of town or city limits, so that there are no city taxes on real estate. The owners of many $7,000 or $8,000 homes near him received tax bills for 1947 for nothing except a cost of 50 cents to send out the notices. He writes: "Five dollars for fireplace wood sufficient for the winter! Why stay near Boston and pay $250 or more for taxes and as much for coal?"

Prescott Nichols wrote to me on September 24, saying that in November, 1946, he bought the shell of a house trailer and spent the following winter and spring fitting up the interior, as a hobby. In April, 1947, he turned in his resignation to the Municipal Lighting Department of the town of Reading, Mass., where he has been electrical engineer for several years, with the expectation that this would take effect on November 1, 1947. He sold his house, disposed of most of his furniture, and moved into the trailer, with the expectation that he would go to St. Petersburg, Fla., for at least the winter of 1947–1948. Early in October, 1947, however, a fatal accident took place in the power station of the lighting department, so that upon request of the management, he agreed to stay on the job for another year. When he wrote me, he was expecting to go to Bradenton, Fla., on last October 25, and probably to buy a small place somewhere in Florida as a permanent home. The best address that can be given for him at present however, is 226 Ash Street, Reading, Mass. — BRYANT NICHOLS, *Secretary,* 23 Leland Road, Whitinsville, Mass. HAROLD S. WONSON, *Assistant Secretary,* Commonwealth Shoe and Leather Company, Whitman, Mass.

• 1909 •

Art Shaw, I, and Heinie Spencer, II, who are our active committee on the 40th reunion report that they have signed up East Bay Lodge at Oyster Harbors for a week end either before or after Alumni Day, June 11. More later. Reserve these week ends tentatively. You have all probably received a letter from President Carl Gram, X, urging contributions to the Alumni Fund as well as calling attention to the 40th reunion.

We were more than pleased to receive a long letter from Calvin Harrub, XI, a member of our class day committee and also the senior portfolio committee. He certainly has a great many accomplishments to his credit and to that of '09 as well, and we know that he would err on the side of modesty. "It has been a long time since I received your letter with the several enclosures re activities at the Institute. I have thought several times of writing to tell you something of myself, but somehow have never gotten around to doing it. You know what is said about the paving in a certain region. Well, it appears that I may have contributed to that paving project. If I begin at the beginning and merely touch the high spots of my experience since leaving Technology it may prove so long that you will lose interest before you finish reading, so I will try to make it as brief as is consistent with facts. You may possibly remember that I was appointed superintendent of filtration for the city of Springfield, Mass., before graduation coming back to graduation several months after I had reported for duty with the city. I operated the old Ludlow filters for the city the last year they were in service, and about the first of the next year, 1910, put the new Mundale plant in operation. I remained in Springfield until the fall of 1911 when conditions became unbearable, and I resigned to accept an appointment as sanitary engineer with the State Department of Health of New Jersey. Molly Scharff, XI, was also appointed to a similar position with the New Jersey Department at the same time. Our classmate, Nichols, XI, was at that time with the New York Continental Jewell Filtration Company, and about a year later left them to take a position on the teaching staff of Carnegie Institute. He recommended me to his former employers, and as a result I resigned from the New Jersey Department and went with them. While with them I traveled all over the eastern half of this country and Canada erecting and trouble-shooting on filtration plants, and gained some experience which has since been of great benefit to me. During those years I took several civil service examinations, government and others, just to see how I stacked up with others in engineering matters, and to my surprise received an appointment as sanitary engineer in the United States Public Health Service in 1916. I stayed with that organization until July, 1921. During that time I had several details: in charge of sanitary surveys of cities and towns on Narragansett Bay and Long Island Sound for two seasons; in January, 1918, I was sent to the south to take charge of malaria control work in the extra-cantonment zone around Camp Joseph E. Johnstone and the cities of Jacksonville and South Jacksonville, Fla. This comprised about 12 square miles of the territory in the vicinity of the camp.

"At the conclusion of World War I, I was recalled to Washington and sent on a tour of the southeastern states visiting the state health officers to find out how the United States Public Health Service could help them in sanitary engineering matters. As a result, I was detailed to the Kentucky State Department in May of 1919, as acting state sanitary engineer, and later had the states of Tennessee and Mississippi added to my territory. While on this detail I was approached by a Nashville consulting engineer with a proposition to go into partnership with him. This had been my goal since I first visited Tennessee, but I wanted to get the State Health Department Sanitary Engineering Division on a firm footing before leaving it, so postponed joining the firm of Klyce and Harrub for two more years. On July 1, 1923, I left the state, and have since been in consulting work. I had succeeded in getting the state legislature to enact a law creating the Division of Sanitary Engineering in the Health Department in 1921, but stayed with the state the next two years to break in my successor. Five years after joining Mr. Klyce he died, and since that time I have carried on the business under the name of C. N. Harrub Engineering Company. Our work has been mainly water supply and sewerage work, with some paving and dams in the states of Kentucky, Tennessee, and Mississippi, and we have had some very interesting problems to work out. In addition to my consulting work I also held the position of sanitary engineer with the Nashville City Health Department, resigning that position about a year ago. I was the first state sanitary engineer of Kentucky, of Tennessee, and of Mississippi, and of the city of Nashville. This briefly outlines my activities since graduating from M.I.T. Now something of my personal affairs.

"About a year after graduation, in April 1910, I married Jessie Alice Morrison, with whom I had kept company since before I entered Technology. We have three children, two boys and one girl, all of whom are grown up and have children of their own. The oldest boy was born in Brockton, Mass., the girl in Trenton, N.J., and the youngest boy in Jacksonville, Fla. The oldest boy is now in the engineering organization of the Nashville, Chattanooga and St. Louis Railroad as assistant to one of the officials, and has a very good position. He has two boys and a girl. The youngest boy is project engineer for a manufacturing company in Indiana, and also has a very good position. He has one child, a little girl. My daughter is now living in Umatilla, Oregon, near the Columbia River, and the recent floods came within one block of her home. She has two boys, so you see I now have six grandchildren. Still, I don't feel old. In regard to my address, I am still living at the same address I have had since 1929, when I bought my present home. My business address has been changed several times. I am enclosing one of my cards announcing my change of address as of the first of January of this year. (148-B Fourth Avenue North, Nashville, Tenn.) I had not heard of Morrill's work in the Orient. He must like that part of the world to have gone over there again. I expect there is a big field for sanitary engineers there now, but I am getting too old to be interested outside the United States. If you have stayed with me this far you are no doubt getting tired of my unexciting experiences, so I will close. If there is anything more that you wish to know about me and mine, I hope I may be able to tell it to you in person at the 40-year reunion of our Class next year."

By coincidence Calvin mentions Art Morrill, XI, in his communication and Art Shaw sends us one from Art himself: "About half the time I am traveling around the interior of China, where sometimes it is difficult to find someone to talk English, to say nothing of doing typing. Traveling by air I have to leave my typewriter in Nanking and try to wangle one when I get to the other end. It is very interesting work and we are getting some things done. But sometimes, alas, my letters get pretty old before they are answered. May and June I spent in Tientsin and Peiping. In spite of what you read in the papers life in those two cities is fairly normal, although Communists may be wandering in the country-

side 30 miles away. While I was in Tientsin they damaged a bridge on the railway just outside the city and one or two trains to Peiping were canceled. Some people in the city thought they could hear the shooting but I did not.

"Economic conditions are very bad, even though the Communists do not stop you from going of an afternoon to have coffee and delicious chocolate cake at Kiessling's. Inflation is accelerating and in all big cities there are thousands of destitute refugees. Still, it is claimed that if all of the goods to be provided by the United States in one year under the Economic Co-operation Administration were sold in the open market, the proceeds would be enough to retire the entire note issue of the Chinese Government. Things wouldn't be so bad if the civil war could be stopped. It is said that perhaps 85 per cent of the national expenditures goes into it, which must be the real reason for the inflation. This morning I had ham, eggs, hot cakes, and coffee for breakfast and the bill was CNC 2.25 million; and that was at our cafeteria which is an inexpensive place to eat. Leaving Nanking last week I only gave the baggage porter $200,000, which I guess was cutting it a little thin. It is not allowed to publish black market rates in China, but in Hongkong the other day a million Chinese dollars were worth 12 cents in United States currency."

Molly, who is also one of our assistant secretaries, sends us several newsy items as follows: "George Weinhagen, II, in Milwaukee and Dan Belcher, II, in Minneapolis have both been seriously ill and would be glad to hear from any of their classmates. Their addresses are as follows: for George, in care of A. George Schulz Company, 433 West Clybourn Street, Milwaukee, Wis., and for Dan, Bemis Brothers Bag Company, Minneapolis, Minn. Lew Nisbet, I, who is practicing civil engineering in Portland, Maine, is planning to be in Florida from November 1 to sometime in May. Joe White, XI, who is chief engineer of the Allegheny County Transit and Traffic Commission in Pittsburgh, writes that his daughter, Alice, is married and is living in California with two beautiful sons; his daughter, Martha, is just about to enter her third and final year of law at the University of Pittsburgh; and his son, Joseph White, Jr., is 19 and entering his second year at college. (See July, 1948, Review.) Ben Pepper, I, writes that he spent a few weeks in Mexico City last spring and that he and Mrs. Pepper celebrated their 35th wedding anniversary with Garnett Joslin, III, and Paul Lord, III. They also had dinner with Paul Lord, his wife and one of his daughters early in August at Cotuit. Incidentally, Paul Lord was in New York recently and had lunch with me. Horace Clark, I, is practicing consulting engineering at Sanford, Maine, and writes that his youngest daughter, Joan Elizabeth, is a senior at Bradford Junior College this year and hopes to enter the Institute to study architecture after her graduation."

Paul submits a most interesting account of his summer odyssey. "Back in August I had a letter from my sister. She and my brother-in-law have lived in Detroit since 1914. They were planning to put the car on the Buffalo steamer and drive to Chatham on the Cape for their vacation and why shouldn't I meet them up the Hudson and go with them? So I went up to Kingston, up in Tom Desmond's, I, bailiwick, to meet them and drive into New England. I knew that Jim Critchett, XIV, upon his retirement from Union Carbide and Carbon, had moved to Orleans, the next town to Chatham towards Provincetown, so naturally I called Jim, found out where he lived and drove over to see him and Ruth in their new home. I wish all of our classmates might have been along with me. Jim has a delightful arrangement – a big and commodious house, and I was particularly intrigued by a workshop among the trees near the house where I am sure Jim can contrive anything from wood and maybe from metal, also. I wish I might include in these notes a snapshot I took of Jim. If he does not look the part of the Lord of the Manor, I just miss my guess! I am sure all of us classmates wish him and Ruth well on their beautiful estate.

"From the Cape we drove up to Boston and I went over to the Institute. To be sure, our 40th anniversary is almost here and I see many familiar faces when I go to Cambridge. But it does seem to me that with every passing year I get more fun as I mosey about on the banks of the Charles. This visit was no exception. In spite of the many difficulties, everything seemed serene and under perfect control. I had just had dinner with Lobby a few days before in New York and when I saw him he had me meet Dr. Compton and again I thanked Heaven for that magnificent man and for the remarkable things he has done for the Institute. I am happy to report that everywhere I heard good reports for Jimmy Killian as he takes over the Presidency. All of us in the New York area have heard and seen Jim at class luncheons and I am sure all of us have always been favorably impressed. Certainly Jim has been well groomed for his noble job and certainly we all wish him well! The buildings looked splendidly. New buildings are being built and the grounds looked simply beautiful, as you might expect. I certainly bring you a good report on what I saw."

Incidentally, Paul paid another visit up Boston way in September and had luncheon with your Review Secretary and Heinie Spencer when we discussed class matters, including the reunion. – PAUL M. WISWALL, *Secretary*, 90 Hillside Avenue, Glen Ridge, N.J. CHESTER L. DAWES, *Review Secretary*, Pierce Hall, Harvard University, Cambridge 38, Mass. *Assistant Secretaries:* MAURICE R. SCHARFF, 258 Madison Avenue, New York, N.Y.; GEORGE E. WALLIS, 1606 Hinman Avenue, Evanston, Ill.

• 1910 •

While I was on vacation, Phil Burnham stopped in at my office on his way back home from Rockport, Mass., where he was enjoying a vacation. I am very sorry to have missed him. Phil left me a clipping giving the news of the death of Bill Haugaard which was a great shock as I had a most pleasant visit with Bill this past spring. I also received a letter from Carroll Benton giving me the same news. The following is an excerpt from the New York *Times:* "William E. Haugaard, an architect with offices at 350 Fifth Avenue, who as New York State Architect in 1928–44 designed State office buildings, prisons, hospitals, schools and other structures erected at a cost of more than $250,000,000, died on . . . [September 16] in St. Luke's Hospital of a heart ailment after an illness of a few hours. Mr. Haugaard, who lived at 395 Riverside Drive, was 59 years old. Mr. Haugaard designed and supervised construction of the Pilgrim State Hospital at Brentwood for the insane which accommodates more than 10,000 patients and more than 2,000 physicians, nurses and other employees. He designed and supervised the erection of the Attica State Prison. In sanitation, educational, rehabilitation and recreational facilities, as well as in strength, the prison is regarded as one of the best examples of modern penological structures. Born in Brooklyn, he was a son of the late John T. Haugaard, a builder. He attended public schools and was graduated in 1908 from Pratt Institute. Later he studied at . . . Technology, where he won the Rotch Scholarship, which enabled him to study at the École des Beaux Arts in Paris. Later he did architectural research in Italy and England. In 1913 he began four years' work at the Panama Canal construction area, where he designed hydro-electric plants, hospitals, office buildings and even entire villages for Isthmian Canal Commission employees. During the first World War Mr. Haugaard served as Construction Quartermaster at the General Hospital, Fort McHenry, Baltimore. He designed many residences, churches and other buildings in this city as a member of the firm of Haugaard and Burnham before his appointment as State Architect in the Department of Public Works in 1928."

Carroll Benton's letter follows: "No doubt you already know about the sudden passing away of Bill Haugaard, so the enclosed clipping may not be news but I will send it along anyhow. Bill's death came as quite a shock. The last time I talked with him was a year ago last July regarding his attendance at the monthly luncheon. He said nothing about not feeling all right then. He seemed to be very busy and, consequently, was usually unable to attend. As I recall, he was able to be present at only one of our luncheons. Bill is the second one of our 1910 luncheon group that has passed on suddenly within the last year. The other was Alfred Phillips. I had just returned home from a six weeks' sojourn in the Laconia, N.H., hospital when I learned of his death. I was doubly shocked in Al's case as I had had a number of telephone conversations with him just before starting on my vacation in July, 1947, regarding the possibility of holding our monthly luncheons uptown at the new headquarters of the local M.I.T. Club. We agreed to get in touch with each other after I returned to the city from my vacation and to go up and look the place over. We never got around to it. A few days after I arrived at Three Mile Island in Lake Winnepesaukee I was taken with violent abdominal cramps and was rushed to the nearest hospital (Laconia) where they performed an emergency operation. I stayed there six weeks (hot ones, too) then went home for two months. The thing

didn't seem to heal up, however, so after a consultation at the Lahey Clinic, I went up to the New England Deaconess Hospital out in the Fenway, towards the end of November, where they performed two more operations. After putting in another six weeks there I came back home the first part of January this year. I have been back on the job with the American Telephone and Telegraph Company since March 1. I am feeling all right now and am very thankful that things turned out so well. I'm sorry that I didn't get around to calling up some of the fellows when I was in the hospital in Boston but with the nurses and doctors and others coming and going I just didn't think of it.

"I don't believe our little luncheon group has met since Al Phillips died, at least I haven't attended any meetings nor have I heard of any. However, I hope we can resume them in the near future. I have talked with Carroll Shaw, Erford Potter and Art Stein recently about getting together again and am hoping that we can. As you know, we have quite a group of 1910 men in and around New York. Stein tells me that he is not feeling at all well (heart condition) and only goes to his office now and then for a few hours. I cannot think of anything more at the moment. The next time I am in Boston I will make it a point to call you up, and I hope it won't be from a hospital, either." — HERBERT S. CLEVERDON, *Secretary*, 120 Tremont Street Boston 8, Mass.

• 1911 •

Another well-deserved honor was paid a loyal classmate when, on the occasion of Northeastern University's 50th anniversary October 2, President Carl S. Ell, XI, conferred the honorary degree of doctor of engineering on Luis de Florez, II, consulting engineer, inventor and rear admiral, U.S.N.R. Preceding the award, Carl read the following citation: "Luis de Florez: Master of creative engineering, with a gift for applying your knowledge to civil and military usages, creator and developer of the art of synthetic training methods for Naval Aviation, you have saved the lives of countless young men of America and contributed substantially to the final victory of our armed forces. In war and peace you have served your country well. Northeastern University considers it a privilege to confer upon you the honorary degree of Doctor of Engineering. In token thereof, I hand you this diploma and invest you with this hood." 1911 salutes you, Monk. In the presence of a notable gathering of more than 1,000 at the anniversary banquet that evening in the Copley-Plaza Hotel, Boston, Carl traced the history of Northeastern from the status of a new educational institution "worth nothing," in 1898, to the present rapidly-expanding seat of learning, with assets of nearly $7,000,000. He also told of the institution's future requirements, including a library building, physical education center, law school building, scholarship funds for freshmen and endowed professorships, all of which he estimated would cost $7,800,000. With your fine record to date and your zeal and persistency, Carl, we of '11 are sure your goal will be reached.

Bruce Goddard Daniels, Yale'48, son of Eleanor and Fred Daniels, VI, of Worcester, was married October 16 in New Haven, Conn., to Janet Beach, daughter of Rev. Dr. and Mrs. David Nelson Beach of that city. The bride attended Carleton College, Northfield, Minn., for two years and then was graduated from the University of Connecticut. After a cruise to South America the young couple will make their home in New York City.

We were indeed sorry to learn of the death of a classmate, Irving R. Pray, V, at his home in Baton Rouge, La., August 27. Irv spent but two years with us at the Institute, but many will remember him as an outstanding player on our freshman and sophomore football teams. He had been a star player at his native Natick high school and returned to that Massachusetts town to coach through 1911. He then coached at Norwich University and later at Louisiana State University. During World War I Irv was assigned to the Intelligence Corps and served with several divisions of the First Army and also with the 1st and 61st French armies. After the War he remained in Germany with the Army of Occupation and was assigned to the German Chief of Staff, in charge of liaison. He was awarded the Croix de Guerre with Palm by General Petain and his victory medal contains five battle stars and three silver stars for citations from G-4. Following his return from the War, Irv made his home in Baton Rouge, La., where he was in the bridge division of the Louisiana State highway department. He is survived by a son, John Fred Oden Pray of Baton Rouge, two brothers and a sister. Interment was in the National Cemetery at Baton Rouge with full military honors.

Your Secretary felt a keen personal loss of a fine friend and the Institute lost one of its most loyal and devoted sons in the passing on September 24 of Professor Emeritus Charles E. Locke'96, Alumni Secretary since 1930.

From Pearson H. Stewart'46, son of O. W. Stewart, I, I learned to my delight that the name and influence of the late Ted Parker, I, our illustrious classmate, continues at Technology and in the Tennessee Valley Authority region, thus keeping alive an important and great name in engineering. O. W.'s son, Pearson, who is director of the East Tennessee office in Knoxville, of the Tennessee State Planning Commission, received a master's degree from the Institute in City Planning. He writes: "Following Colonel Parker's death many of the Tennessee Valley Authority's engineering personel were unwilling to see his name and influence forgotten, so great had been his contribution as chief engineer since TVA's inception. Consequently the Colonel Parker Fund was established in order to send students from southern states to the graduate school at M.I.T. Several students have already attended by means of this fund and two are there right now. Approximately $1,000 was raised by voluntary contributions of TVA employees to give it a start, but since then money has been contributed to the fund from royalties received from various articles written by employees of the Authority. The fund was greatly increased in this manner by David Lilienthal from the royalties of his book, *Democracy on the March*." We find that the Colonel Parker Fund, amounting to the tuition for an academic year of graduate study, is listed in the M.I.T. catalogue.

John Taylor Arms, IV, was among the artists exhibiting at the 19th annual Southern Vermont artists' show at Manchester in the 10-day period ending with Labor Day. In a column, "Meet the Artists," the Rutland, Vt., *Herald* said about John: "For five years following graduation from M.I.T. he was a practicing architect in New York City, where he made his earliest etchings. Both careers were ended when he entered Navy service in World War I. Later, he decided to devote all his time to the copper plate medium. An article on Arms, published in *Print* in 1941, says in part: 'Decidedly John Taylor Arms is an exception among etchers. No other American printmaker has reached so wide an audience. None knows so many of his fellow etchers by their first names. No five of them have put so much devoted labor into the cause of etching. Any young etcher about to embark on his career has a firm potential friend in him. He manages to execute the most minutely-etched plates ever attempted in American printmaking. The spiritual quality which underlies his etchings springs from the affection which he feels for his fellow man as well as for his own work.' " A fine tribute, John.

How did you like the initial (September, 1948) issue of the new "M.I.T. News Letter"? We liked it a lot. — Harry Tisdale, V, Vice-president of American Dyewood Company in New York City, writes that he took a little vacation in June, first attending the American Leather Chemists' meeting at the Mount Washington, Bretton Woods, N.H., and then continuing on via automobile to Montreal and Toronto, finally ending up at Bigwig Inn at Lake of Bays, Ontario. He adds that Rose and Joe Harrington, VI, took a trip to Nova Scotia in August but were a bit disappointed, on the whole, as they expected a great deal from the circulars which they received on that section of Canada. Joe did manage to get in some salmon fishing, though.

A "young blood" policy in the Air Force has been evident ever since General Hugo S. Vandenberg, 49, became chief of staff and so perhaps it should not have surprised us as much as it did when on September 20 announcement was made that Lieutenant General , Curtis E. LeMay, 42, American air commander in Europe, had become chief of the Air Force's Strategic Air Command, succeeding our own four-star general George Kenney, 59, who became immediately thereafter head of the Air University at Maxwell Air Force Base, Montgomery, Ala. "The surprise nature of the announcement," said the New York *Herald Tribune*, "was shown by this terse comment from General Kenney at his office at Andrews Air Force Base near here: 'It's brand new to me. When you get orders you have to obey them. I just got the word.' " Subsequently the Boston *Globe* said: "It is known that Kenney preferred to remain as head of the Strategic Air Force for the Bostonian is an 'operator,' that is, an airman who specializes in field and combat missions. At the Air University his new post is administrative, but the Air Force's command and staff schools

and Institute of Technology intend to draw heavily on Kenney's background in technical intelligence and strategic bombardment."

Class President Don Stevens, II, wrote to George: "I've read the news and I hope that this can be construed as good news for you. You have certainly done a great job for your country as the citizens know and ever since the end of the War you have not had one moment's rest from tremendous responsibility. I hope that the change now coming up will mean relaxation, long life and good health!" So say we all of us.

We had our first snow here in Gardner September 18, but it was just the tag end of a cold rain storm. Three weeks from today we have our annual class dinner at Walker Memorial and next month's notes will have the complete story. In closing, here's a cheery Merry Christmas to you all from Dennie and Jack. — ORVILLE B. DENISON, *Secretary,* Chamber of Commerce, Gardner, Mass. JOHN A. HERLIHY, *Assistant Secretary,* 588 Riverside Avenue, Medford 55, Mass.

• 1912 •

The Carl Rowley family certainly stepped into the limelight last month as their son, Charles, was married on September 18, to Louise Stevens of Concord, N.H. and on September 20 their daughter, Elizabeth, was married at the Rowley's summer home to Eugene Tittmann, Jr., of St. Louis, Miss. Both the Cleveland and Boston papers carried announcements of this dual event, as Carl's eldest daughter, Jane, now Mrs. Ralph Snow, is living in Belmont, Mass.

A good letter from Albert Gale, Boxford, Mass., gives us a glimpse of his activities. For the past 28 years he has been with the General Electric Company working on the design and application of auxiliary steam turbines for Marine and Naval use. He has just received a Certificate of Commendation from the United States Navy Bureau of Ships for his work with them during the last War. His division has recently been transferred from Lynn to Fitchburg. Shirley, Al's elder daughter, graduated from the University of Massachusetts and received her master's and doctor's degrees from Radcliffe College. She married a Harvard graduate (Ph.D.) and is now the mother of two boys. The younger daughter, Virginia, is a laboratory technician at the Polyclinic Hospital in New York City.

The Gales built a new home in Boxford early in 1940, designed by Cy Springall. Al has a Weimaraner dog, which is quite new in this country and which makes a fine hunting and watch dog. A vegetable garden in the summer and wood chopping in the winter keep Al in good physical condition. Now that he is getting older he has given up mountain climbing as being a bit too strenuous.

Bob Wiseman enjoyed a very interesting trip abroad this summer. In Paris he presented a technical paper before the Conference Internationale des Grands Reseaux Electriques à Haute Tension entitled, "The Oilostatic Cable System." Bob also checked with Okonite's affiliates in England on problems of mutual interest and visited the larger cities there as well as in Norway, Holland, France, and Italy. While in Rome he had the honor of an audience with Pope Pius XII. He found time to spend four days at the Olympic games. He reports that living conditions are extremely difficult in all countries that he visited and is glad to be back in the United States.

Your Secretary had the good fortune to make a trip abroad this summer and spent about a month in England, France and Switzerland on business and pleasure. Living conditions are certainly difficult and there is a feeling of uncertainty, especially on the Continent. The general morale in England seemed excellent although the people are subjected to strict rationing and all kinds of regulations, as the Laborite Government pretty well controls every move they make. The people in France seemed to be in a more cheerful mood, although the economic situation there is considerably worse than in England. They do not care to face the fact that their budget is badly unbalanced and that only by strict economy and hard work can they hope to get back to a self-sustaining basis. Switzerland is a delightful oasis in a confused world; everybody is gainfully employed and they do not have to cope with rationing and other depressing regulations. — FREDERICK J. SHEPARD, JR., *Secretary,* 31 Chestnut Street, Boston 8, Mass.

• 1914 •

Ernest Crocker, chairman of the Northeastern section of the American Chemical Society, has made quite regular appearances in the New England press this fall. Crocker, it is learned, has a rather strenuous winter planned with speaking schedules scattered well over the country. His talks will deal largely with the subjects of odor and taste as they pertain to oils, soaps, toiletries, shortenings, and many types of processed foods. In this field of odor and taste, Crocker is considered one of the outstanding authorities of the country. — Your Secretary recently attended an Instrument Society dinner in Philadelphia and was delighted to find Ernest D. Wilson present. Wilson has been the head of the chemistry department of Worcester Polytechnic Institute for quite a number of years.

Dean Fales has purchased a house in Kennebunkport, Maine. This act concludes about 20 years of searching, and also means that Dean will spend about six months of each year there. While built primarily as a summer house, the construction and equipment are such that it could be used as an all-year residence. It formerly belonged to a well-known artist and has a two-story-high studio, in which Dean says future 1914 dinners should be held.

Thanks to William Jackson, one of our honorary classmates, the following is a list of our classmates who served with the Armed Services during the last War. If any omissions or errors are noted, please send them to your Secretary in order that the class files may be complete: Lyman S. Baird, Captain, A.U.S.; Roswell F. Barratt, Commander, U.S.N.R.; Max M. Braff, Lieutenant Commander, U.S.N.R.; Lucian W. Burnham, Colonel, U.S.M.C.; Arthur E. G. Collins, Group Captain, R.A.F.; Thomas H. Green, Major General, U.S.A.; Herbert H. Hall, Major, A.U.S.; Frederick P. Karns, Major, A.U.S.; Charles S. Lee, Commander, U.S.N.R.; William E. Lucas, Lieutenant Colonel, U.S.A.; Raymond D. McCart, Commander, U.S.N.R.; Fred D. Mendenhall, Major, A.U.S.; Stanley W. Merrill, Captain, A.U.S.; Ernest L. Osborne, Colonel, A.U.S.; Thomas B. Richey, Rear Admiral, U.S.N.; Ralph D. Salisbury, Colonel, A.U.S.; Paul R. Smith, Commander, U.S.N.R.; Welton A. Snow, Lieutenant Colonel, A.U.S.; Harold G. Storke, Colonel, A.U.S.; David L. Sutherland, Lieutenant Colonel, A.U.S.; Alden H. Waitt, Major General, U.S.A.; John E. Wood, Brigadier General, U.S.A.; Frank T. Yeh, Captain, Chinese Navy.

As this will be the last issue of The Review before the holidays, your class officers wish you all a merry Christmas and a happy New Year and hope you will resolve on New Year's Day to be present June 17 to June 19 at Pine Orchard, Conn., for our 35th reunion. — H. B. RICHMOND, *Secretary,* General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass. CHARLES P. FISKE, *Assistant Secretary,* 1775 Broadway, New York 19, N.Y.

• 1915 •

Many thanks to you all. Keep up your good work for the Alumni Fund. The few remaining contributions to come in should put us over the top again. More interesting class dues letters — most of them written in long hand, an added testimonial of the loyalty and interest of these busy men to take this time to write for their classmates' perusal — appear below.

Evers Burtner, Department of Naval Architecture, M.I.T.: "The big news in my family is my daughter's marriage to Irving Clark Thayer of Carmel, Calif. They drove across country on their honeymoon and are making their home in the San Francisco area. From now on the glories of California eclipse anything New England has to offer as far as Cynthia is concerned. Our Department of Naval Architecture and Marine Engineering at the Institute has a new skipper in the person of Admiral Cochrane, formerly in charge of the Bureau of Ships. He is introducing some new concepts of instruction which will be material improvements."

After years of silence, Hubert James writes from 218-41st Street, Manhattan Beach, Calif.: "Since V-J Day, I have been with Holmes and Narver, consulting engineers of Los Angeles, where I found James T. Holmes'14 one of the most pleasant and courteous of bosses. In fact, I only left there last year to take a job, three miles from home, back with Stone and Webster at their new office on the Southern California Edison job at Redondo Beach, where I am assistant in charge of the structural engineering group. We have a $70,000,000 project there and will later expand to an office for eleven western states, with some large jobs in sight. Of the old Course IV crowd, Harold Crowell, Walt Rivers and H. P. Sabin are still around and all going strong."

My thanks to Bob Schmucker for his kind words. From 545 Union Street, Hudson, N.Y., he writes: "Anyone who has done as much as you have for the Class of 1915 deserves immediate support. Nothing important, I am glad to say (depends upon how you look at it!) happens to me. For the past 17 years I have been teaching in the local high school and have learned, among other things, that there is as much diversity of opinion in education as there is today in domestic and foreign policy. Every summer for about 12 years, except when the War prevented, I have been going to the Maine woods to fish for trout in a group of lakes about 35 miles northeast of the southern tip of Moosehead Lake. Once while at the Institute, I spent a happy week end on the Maine Coast with Sanford Willis, who was in the now-abandoned mining course with me. I regretted greatly to read of his illness and later of his passing away. My son graduated from Technology in 1939 in physical metallurgy and has been with the same company in Newark, N.J., ever since. On account of the nature of his work he was never in the Service. Although I seldom write, I always read the class notes and want to express my thanks and appreciation of your long continued and excellent work as Class Secretary."

Although not actually a regular classmate, M. F. Coolbaugh certainly is interested in being classified with '15 and writes this splendid letter from the Colorado School of Mines, Denver, Colo.: "It has always amused me to be considered a member of the Class of '15. When I was there I was carrying on research work in metallurgy. To obtain this privilege I was informed that it would be necessary to register and that I would then be allowed to attend classes of my own choosing. I selected courses which did not interfere with my research, but never took any of the tests or examinations. Before coming to the Institute, I had received two degrees, the B.S. and M.S., so it never occurred to me that I would be considered a member of any class. You can understand how surprised I was to find myself classified as a member of the Class of 1915. I must say, however, that I felt honored to be included with the group. As the years have passed I have contacted a number of the members of the Class in various parts of the world and it always brings back a feeling of friendship for the students and the faculty members I learned to know so favorably at the school. On January 1, 1946, I retired from the presidency of the Colorado School of Mines after being in the position for more than 20 years. Before engaging in school work I had been director of research for the Metals Exploration Company, a Harry Payne Whitney Organization. Since retiring from school administration activities I have again taken up research, but this time more as a hobby, although I am at present directing, quite actively, a Federal Government research problem for the production of synthetic mica, with several men working with me. It shall always be my wish to keep in touch with M.I.T. and the wonderful advancement it is making."

A delayed letter from Vince Maconi, 63 Brookside Avenue, Hamden 14, Conn., written last spring after his winter vacation: "When I 'dug' into my pile of mail on my return from Florida, I discovered your letter written over a month ago, so please pardon me for this late reply. After my daughter, Lois, returned to Bryn Mawr College and my son, Norman, to Yale following their mid-year recesses, my wife and I decided to head south so as to absorb some Florida sunshine. The weatherman behaved royally while we were there and as a result we had a wonderful time. I managed to get in several games of golf and I did some fishing. The golf strokes came in liberal quantities but as for the fish, they just couldn't see their way clear to join my company in the boat. Well, in any event, I tried and did succeed in feeding many of them generously. After three weeks of fun I headed home because my son, Dick (M.I.T. 1944) who was pinch hitting for me kept telling me how well everything was going in the office during my absence. My idea was to get back on the job before the whole organization found out they could well get along without me. I do hope we will have some kind of a get-together in June. It seems too bad to space those wonderful reunions five years apart."

The Roxbury, Mass., *Citizen* of September 30 carried a large, fine picture of Fannie Freeman receiving a testimonial gift for his devoted, untiring and unselfish work with the Boys' Clubs and Playground Group in the Roxbury section of Boston. Congratulations to Fan, a well-deserved reward for his long years of noble service to this worthy work. Gabe Hilton served with a number of other Alumni on the committee for the annual outing of the M.I.T. Association of Buffalo, at Grand Island, near Niagara Falls, September 11. A good time must have been had by all.

The following is a supplement to our summer visits with classmates. Norris and Marion Kimball, of Akron, have three children: Louise, taking her master's degree in physical and social service at Simmons College, Boston; Ralph, a G.I., who was graduated in 1948 from Kent College, Ohio, and who will go to the University of Michigan for two years' additional study in industrial engineering; his son, Larry, puts Norris in the grandfather group; Nancy, a senior at Dennison University, Granville, Ohio.

Parry Keller's son, Parry, Jr., a graduate of the Illinois Institute of Technology, was an ensign in the Navy and is now studying for his master's degree at Case Institute of Technology, Cleveland. In Taunton, Mass., I had a delightful lunch with Loring and Mrs. Hayward at their comfortable house. Their four children have grown up and scattered: Loring, Jr., a lieutenant commander in the Navy and in a great deal of the rugged shootings, is now an inspector in the Division of Yachts for Aetna Insurance Company; Richard, a major in the Ninth Air Corps, is now with the New Hampshire State Board of Education; Barbara, married to Marshall Waite, is secretary to the director of social activities at Cornell, where her husband a G.I., is a senior in industrial engineering. Loring's youngest son, Robert, is a freshman at Bates College, Maine.

Next month we hope to have the story of the New York and Boston class dinners to plan our 1950 reunion and present Gene Place's report on our *fiftieth* (1965) *reunion* capital gift fund. Help! Help! — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline 46, Mass.

• 1916 •

We regret to inform the Class of the untimely passing of Richard E. Hefler, who died in Elizabeth, N.J., on August 22. He was vice-president and treasurer of the Hefler-Snyder Company, contractors of Plainfield who specialized in road contracting. The entire Class extends its heartfelt sympathy to the bereaved family.

News from classmates via the United States mails has been skimpy during the last month, and our pleas for contributions have met with far too little response. We can't publish anything unless we know what we're writing about, and you know who can furnish the knowledge. At any rate, a clipping datelined Washington informs us that David L. Patten has been appointed head of the Economic Co-operation Administration's mission in Portugal by its administrator, Paul G. Hoffman. Dave was a partner and director of the investment banking firm of Whiting, Weeks and Stubbs for nearly ten years up to 1942, and has recently been a private consulting engineer.

We *did* receive a few letters, however, contents of which are well worth quoting. Dexter North dropped us a line from Washington giving information on his latest ventures. He writes: "For six years prior to the War I was a consulting chemical engineer in Washington, principally as Washington consultant for Arthur D. Little, Inc. Soon after the War I was drafted into a war job with the Office of Alien Property Custodian where I had charge of work in connection with use of the seized patents for war production and later in reconversion to peacetime activities. For over a year now I have been with the Central Intelligence Agency, where my duties are extremely interesting but, of course, cannot be discussed."

Phil Baker, who, as we recall, offered the Class the key to the city of Detroit in 1951 if we would hold our reunion there, keeps our Assistant Secretary well informed of events. He says: "Steve Brophy's victory train has just gone through Detroit. Steve is one of those wonderful fellows who always has his name associated with victory and to whom everyone always wishes victory. Cy Guething, to repeat, is as young looking as ever. His boy is in business with him as a manufacturer's agent. Tred Hine is yet unmarried. He has a fine position with the Chrysler people in charge of their building and maintenance. We see Howard Foster around town, quiet as ever, but with that hawk eye for oil. As for me, I am trying to see if some of these new cars will be available for you by our next reunion. I am still in real estate. My young lady just finished Pine Manor. When in Boston, I was astounded at its growth and traffic. There is room for some real traffic engineers all over America. One of the nicest things that has come our way is Ralph Fletcher's lovely daughter who has married and now lives in our city. Her

husband is an able young man with McGraw-Hill Company."

Walter Fowle has hit upon an excellent idea that may well be copied by some of the others who are busy at the time we request some notes but don't want to disappoint us. He sends us some very interesting literature on his business, together with an aerial view of his smart-looking factory in Woburn, Mass. Walt is a partner of the J. L. Fowle Company, manufacturers of band saws and band knives for over 50 years. One of his little brochures points out that his laboratory stands ready to make extensive tests to determine the exact type of saw or knife for your particular need and we are impressed with the fact that if you have a problem of this sort, you may go to him and be assured of two things, quality and satisfaction. If you need a new carpenter's hand saw, for example, we suggest you get one of his Number 7's. We have a welcome word from Warren Ames on stationery headed B. C. Ames Company, Waltham, Mass., manufacturer of micrometer dial gages and micrometer dial indicators. Warren says: "I do not run across many classmates in my few travels, but see Henry Shepard at Brae Burn Country Club quite often, otherwise stick to the plant pretty closely. I now own B. C. Ames Company and business is good with me. Have good customer list, including Bell Telephone Laboratories, and a good product. My two older children, daughters, are married and I have two grandchildren. One of my two sons is working in my shop learning the business, and the other is at a prep school for a technical education. This is only a little, but may help." It certainly does help, Warren, and it isn't just "a little." We need more like you.

Last May your Assistant Secretary attended Tree Day exercises at Wellesley where his daughter, Dorothy, has just completed her junior year. While waiting for something to happen in the great hall of Tower Court he discovered a familiar male face which, in turn, appeared to show some signs of recognition — none other than Allen Giles, whose daughter is also at Wellesley. The two young ladies are well acquainted but were quite unaware of a common M.I.T. 1916 background. Allen, by the way, promised to send some notes for the column.

Hen Shepard has answered the call of the secretaries with the following: "When World War II started, I was pleased to find that I was still young enough to get back in the Navy as a lieutenant commander. I was assigned active duty here in Boston, in the spring of 1942, as a naval advisor on production and procurement. I had an office at the War Production Board and was more than busy expediting materials for naval contractors in this area as well as the various Navy Yards. In the summer of 1943, I was sent to Guantanamo, Cuba, as ordnance officer for the Naval Base. There I had charge of all Naval magazines, gun repair and station security. I spent eight months at Guantanamo and then was assigned duty in the Pan-American division of the Chief of Naval Operations in Washington. My work on this tour of duty was chiefly lend-lease with all of the west coast South American countries. In 1944, I was put in inactive duty as the Navy discovered that I was too old to 'take a girl on either arm.' After a short vacation I came back here to Stowe-Woodward, Inc., where I am now vice-president. We manufacture all types of rubber products, principally rubber-covered rolls, molded articles and bowling balls. My responsibility is principally to see that the quality of our bowling balls is maintained, and that we have proper distribution. We have sales outlets in all of the larger cities in the United States. My three children are now all away at school. Henry, Jr., will graduate from Yale this coming January, Ann is a sophomore at Hollins College in Roanoke, Va, and Dudley, the youngest, has two more years at Andover. My wife and I find it very strange to be alone in a large house except for whirlwind visits during vacations. I still enjoy my golf very much, indeed, and boast a 14 handicap. I now have a new hobby which is the restoration of old automobiles. Last year I drove my 1918 Stearns Knight in the Glidden Tour which covered all of the New England states. At present, I am working on a 1921 Mercer Raceabout and expect to get it out on the road next spring after a complete rebuilding job; engine, transmission, rear end, everything. It is a lot of fun as I have a completely-equipped workshop in my cellar, and I get a big kick out of solving some of the mechanical difficulties which are encountered. When I get through, the Mercer will be just as good as the day it left the factory, in appearance and performance. I spent my vacation this summer in Randolph, N.H., where we have a little cottage up on Mount Crescent, with 2,000 foot elevation. I did not do any mountain climbing as I spent most of my time chopping down trees and building a new woodshed."

And George Petit comes through just the way the old secretaries like it with: "You asked for a return mail reply, so here it is. When you ask me what I have been doing during the past five years you make me feel as if I had graduated in 1943. You should have asked what I have been doing the past half century! Well, I am still with the Travelers Insurance Company enjoying the working part of living. Our son, whom we adopted as an infant, is now in his tenth year. His future is our great hope. Of course, we'd like to see another George Petit in M.I.T., provided he doesn't show an interest in the low alphabetical marks I made in certain subjects. I can see where the '16 class notes are going to be a success with you and Ralph Fletcher at the helm. [Ed: Thank you, George.] Tell Steve to get that 35th reunion rolling."

Does anybody have the address of Fred F. Glen? Fred, if you read this column, give us a break by telling us your address. Two letters have already been returned from two different addresses, and the Alumni Office can't help either. And all the rest of you — write, write! — RALPH A. FLETCHER, *Secretary*, Post Office Box 71, West Chelmsford, Mass. HAROLD F. DODGE, *Assistant Secretary*, Bell Telephone Laboratories, 463 West Street, New York 14, N.Y.

• 1917 •

As these notes go to press the big news, which will be old by the time the December issue of The Review is received by you, is the change in the administration at the Institute. Many individual members of the Class count Jim Killian as a personal friend. We wish, through this column, officially, as a class, to congratulate Jim on the high honor which he has received, to wish him the best of luck, and to pledge our support in the great challenge which he is facing in succeeding our beloved Karl Compton, who is still to be with us as Chairman of the Corporation. Those of us who know him have no doubts as to his ability to meet it.

Again we are speaking in the past as far as our readers are concerned, but at this writing, the returns from our initial appeal for the class gift are pretty well in and, we are proud to say, are most gratifying. A total of 85 sent in reply cards with 45 definite commitments for 10-payment life policies, totalling $75,000, about 20 deferring action or requesting additional information, and the remainder definite no's. A follow-up campaign is now in the process of organization and from the interest in both the Class and the Institute as evidenced by the biographies furnished for the Class Book, we have high hopes of a minimum goal of $200,000. If you have not done so, please send in your reply card pronto. If you have mislaid it just drop a post card to your Assistant Secretary and you will receive full information.

Speaking of the Class Book, we invite your attention to two classics contained therein. The prize is the biography, and especially the last sentence, of Horace Baxter. We submit that the earlier book, meaning *Technique* 1917, was definitely wrong. For the second item of interest we refer you to the biography of Al Ferretti. We ventured to state a few months ago that Thurber Fales has reached the ultimate as regards alphabetical designations but believe that Al runs a close second. Refer to page 89. We are grateful for his guiding comment that all of this multitude of letters are associated with engineering. That is as it should be.

After all these years we have a note from Nig Sewell who many of you will remember as the raconteur par excellence of French Canuck stories. Nig has gone in for cruising. His home port is Oneida, which, though far from the salt spray of our old rendezvous, Marblehead, offers ample opportunity for grand cruising with only, to quote Nig, "loons and whip-o-wills to bother you." Another long lost member of our Class that the Class Gift uncovered is Al Tonry who shares the distinction, along with Sherry O'Brien and Walt Whitman, of having been reared in Winthrop, Mass. Al has been hibernating right here in Boston for many years. We have his promise that we will see more of him. A recent news dispatch informs us that Albert E. Tuttle, Commander, U.S.N.R., (Ed to us) has been appointed to the staff of Organized Surface Brigade 1–1, United States Naval Reserve. We frankly do not know what an Organized Surface Brigade is, but trust it is not in a class with the horseless cavalry.

We are indebted to Hu Wellcome for the remainder of our news this month. He reports that he recently visited Dud Bell and adds, "we always manage to have a laugh at Dudley's." We are glad that he put that apostrophy *s* in there so we could be sure he was laughing with Dudley, and not at him. (That is just a weak attempt at being facetious, Dud. We all love you.) Hu also informs us that one Colonel Stribling left a while ago for the Philippines where he will be on the joint United States Military Advisory Group. Rudy Beaver left Boston recently on a trip to the West Coast. We hope he returns full of news for the class notes. Incidentally, Lobby is following the same route in about a month to pick up the pieces of dignity, sobriety, and so forth, which Rudy may lose enroute. We regret to record the death of Wolfram A. C. Futterer on June 29. — RAYMOND STEVENS, *Secretary*, 30 Memorial Drive, Cambridge 42, Mass. FREDERICK BERNARD, *Assistant Secretary*, 24 Federal Street, Boston, Mass.

• 1919 •

The New York *Times* of October 2 carried a picture of Timothy E. Shea and an announcement that he had been elected president and director of the Teletype Corporation. Tim went with the Hawthorne Works of the Western Electric Company in Chicago in 1920 as a development engineer and a year later transferred to the company's engineering department which became Bell Telephone Laboratories in 1924. He developed filters and networks used for transatlantic radio, carrier telephony and television. In 1929 he was placed in charge of acoustical, optical and electrical development in connection with sound motion pictures. He also supervised the development of public address, train dispatching and allied forms of equipment. In 1939 he was elected vice-president of Electrical Research Products, Inc. From 1941 to 1945 he served as director of war research at Columbia University, and as a member of division six, undersea warfare committee, National Defense Research Committee. He directed the submarine research laboratory at New London, Conn., and supervised a large force of engineers and scientists working with the Pacific Fleet at Pearl Harbor. He is the author of *Transmission Networks and Wave Filters*. He received the Medal for Merit, the highest civilian award, and a presidential citation for exceptional services to the submarine forces of the United States Navy. Columbia University awarded him the honorary degree of doctor of science.

Benjamin H. Bristol writes to say that he will attend our 30-year reunion. Elizabeth Coit is at present working with the New York City Housing Authority as a principal project planner. Marion Daniels dropped a line to be remembered to the Class. Rod Bent says he will attend our 30-year reunion. Ev Doten writes: "I have definitely in mind the reunion of next year and have every intention of being with you. We regret that George McCarten has just moved to Cleveland, as we shall miss the many visits with George and his family. We wish him all kinds of success in the new business he is setting up there." Mrs. Thomas S. Derr wrote to comment on her husband's recent death which we announced in our November column. Maurice Role informs us that he is in the electrical engineering consulting and electrical contracting business. Andrew A. Cook, Lieutenant Colonel, U.S.A., has moved from LaCrescenta, Calif., to U.S.A. Marietta T.C. Depot, Marietta, Pa. Fred Hewes has moved from Hyde Park, Mass., to Pacific Gas and Electric Headquarters, Storrie, Calif. Carl L. Whittemore has moved from Worcester, Mass., to 289 Richard Avenue, Paxton, Mass. — EUGENE R. SMOLEY, *Secretary*, The Lummus Company, 420 Lexington Avenue, New York 17, N.Y. ALAN G. RICHARDS, *Assistant Secretary*, Dewey and Almy Chemical Company, 62 Whittemore Avenue, Cambridge 40, Mass.

• 1921 •

On behalf of the Class, we extend heartiest congratulations and a pledge of continued support to the new President of M.I.T., Jim Killian'26. We welcome Dr. Compton in the new role of Chairman of the Corporation and express sincere good wishes on his important assignment as Chairman of the Research and Development Board of the National Military Establishment.

Winthrop E. Luke of Belmont, Mass., has been appointed head of the architectural and building construction department of Wentworth Institute, Boston. He was formerly with the Stone and Webster Engineering Corporation. Also in the educational field is Edward F. Praetz, who heads the mathematics department of the Lawrence, Mass., high school. Ed had been with General Electric in Lynn and later with the Saco-Lowell Machine Company. During the last War he served as a major. Devenco, Inc., announce the appointment of Walter W. Anderson as supervising engineer in charge of architectural design in the power plant division.

Augustus B. Kinzel, new president of the Union Carbide and Carbon Research Laboratories, Inc., has been associated with various metallurgical units of that corporation since 1926. He was graduated from Columbia, Technology and the University of Nancy, France, where he received the doctor of science degree in 1922. Gus is the author of many papers on the testing and welding of metals and is co-author of the volumes on chromium in the "Alloys of Iron" series of monographs. He has headed many important committees of the American Welding Society, American Institute of Mining and Metallurgical Engineers and the American Society for Metals. He serves as director of the first two of these organizations and is chairman of the Engineering Foundation and chief consultant to the Los Alamos and the Argonne National Laboratories of the Atomic Energy Commission. In addition to his work for the Manhattan District during the War, he was senior consultant on metals for the War Production Board, chief consultant on metals for the Foreign Economic Administration, project supervisor for the War Metallurgy Committee and head of the metals section of the Technical Industrial Intelligence Commission in England, France and Germany. In 1947, he received the Samuel Wylie Miller memorial medal from the American Welding Society.

William L., and Mrs. Knoepke of Short Hills, N.J., announced the marriage of their daughter, Doris Charlotte, to Donald W. Steinmann of Rochester, N.Y. Phil and Edna Coffin of Glen Ridge, N.J., report a very pleasant trip to the summer convention of the American Institute of Electrical Engineers in Mexico City. Leo Mann, head of Leo Mann and Company of Boston, purveyors of Gamecock specialties for men, has issued an attractive catalog of his unusual line of flaconettes and accessories.

John W. Barriger, President of the Chicago, Indianapolis and Louisville Railway Company, continues to carry out new and progressive ideas for the Monon, which are reflected in the marked increase in passenger and freight traffic since he assumed top responsibilities. In this, its centennial year, the Hoosier Line has a new emblem, a new illustrated slogan (The Lifeline of Indiana), new diesel engines throughout for all services and new rolling stock of all kinds. One of the latter, Monon Box Car Number 1, was on display at the Chicago Railroad Fair after more than a year of service in which its many trips across the country were charted. Jack's idea is to use low numbers to avoid error and to speed up the numerous recordings and reports. Bob Waterman may be interested to note that this car carried Schering's pharmaceuticals from their Bloomfield, N.J., siding to San Francisco about a year ago. Jack's son is a senior at the Institute and an officer of the Technology Christian Association.

David O. Woodbury, writer, engineer, radio and movie playwright, lecturer, teacher and raconteur par excellence, is receiving considerable mention for his eighth book, *Battlefronts of Industry*, which was published by John Wiley and Sons last June. The story is built around the wartime activities of the Westinghouse Electric Corporation. A recent issue of *Business Week* describes the pioneering development work of the Thaden-Jordan Furniture Company, Roanoke, Va., of which Herbert V. Thaden is president and general manager. Laminated furniture is produced with special molds and synthetic adhesives that bind and shape veneers into finished contours.

Herb DeStaebler, Vice-president of the Lambert Pharmacal Company, crosses the finish line with the first secretarial committee report for the month. Says Herb: "Robert B. Donworth was here in St. Louis. We took some time off from his convention and had a most delightful afternoon and evening together. Bob is still with the Duquesne Light Company of Pittsburgh, in power station engineering. He looks fit and handsome and I hope he and others of the Class get out here soon and often."

From Washington, Larry Conant sent data on George Schnitzler who, for the past 25 years, has been connected with the National Bureau of Standards. George is engaged in the inspection and testing of incandescent, fluorescent and photoflash

lamps at the factories of those companies which are under contract to the government. He also prepares and revises lamp specifications to which the products are made. George says he spends about one day a month in Washington and the balance in the field, principally in the vicinity of New York and Boston. He continues, "I was married in 1929 and have one child, a daughter, Laura, who is 15 years old and a sophomore at Brookline High School. My principal hobbies are taking in most of the hit shows in New York, and tennis, at which I am still quite proficient. This ought to bring out some challengers next summer."

Thanks to Orville B. Denison, Secretary of the Class of 1911, for his kindness in sending a clipping from the Boston *Post* announcing a lecture on "Hypertension" by Reginald H. Smithwick, head of the department of surgery, Boston University School of Medicine. Reg has become an internationally famous leader in his profession. His address concluded a two-day observance of the centennial of the School of Medicine.

Recent phone calls have come from Harold Stose and Max Burckett. Harold has a new home address, 62 Elston Road, Upper Montclair, N.J. Max is still concerned with export manufacturing for Vick Chemical Company, New York. We enjoyed a luncheon with Arthur W. Skilling after bumping into him in downtown New York and discovering that he is located a block from us in the Socony-Vacuum Oil Company building. Art is Socony's assistant real estate manager. Another pleasant luncheon celebrated the first meeting with Arthur N. Brambach since graduation. Art has been local manager for International Business Machines in Seattle for many years. He was in New York preparing for a new assignment as the special representative in Germany. Art is a proud grandfather. His daughter has a boy of five years and a girl, aged one. Art's son, who was married last July, returned from service with the 10th Mountain Infantry to complete his studies at the University of Washington. He is an outstanding skier, a former instructor at Sun Valley and last year's winner of the Chilean championships.

We ran into Joseph G. Hauber in the lobby of the Electric Bond and Share building. He is in the estimating department of Ebasco Services, Inc. Ray Patten, director of design for the General Electric Company of Bridgeport, Conn., died on September 13 after a long illness. A native of Malden, Mass., he was a member of Course II at the Institute. His early work was devoted to custom body design for Packard and Cadillac automobiles. He joined General Electric in 1928. Ranges, dishwashers, kitchen appliances and other exhibits at the Chicago World's Fair were the result of his designs. In 1939, he received the Lord and Taylor award for range design. He was a charter member of the Society of Industrial Designers. He is survived by his wife, Mrs. Margaret DePue Patten, a son, Robert, and a daughter, Nancy, all of Westport, Conn.

Lester F. Rhodes, a colonel, heads the department of military science and tactics at Clarkson College of Technology. Jorge A. Beeche is in Santiago, Chile, where his address is Calle Augustinas 1111, Oficina 617. Richard McKay has moved his family to the Boston area and is residing at 50 Victoria Circle, Newton Center 59, Mass. Thomas B. Card is off on another foreign assignment, this time to the Argentine. He can be reached in care of Parsons, Brinckerhoff, Hogan and Macdonald, B. Mitre 366, Salta, Province de Salta, Argentina. Lawrence B. Richardson is with the Fairchild Engine and Airplane Corporation, 30 Rockefeller Plaza, New York 20, N.Y. Richard W. Smith is still in Washington, D.C., with the natural resources department of the Chamber of Commerce of the United States. In the same vicinity is Bernard H. Moran, a lieutenant commander, whose new address is 206 Elm Street, Alexandria, Va.

A very Merry Christmas and a most happy New Year to all of you! — CAROLE A. CLARKE, *Secretary*, International Standard Electric Corporation, 67 Broad Street, New York 4, N.Y.

• 1922 •

Bill Stose is assistant refinery superintendent for the Philadelphia refinery of the Atlantic Refining Company. His work covers the supervision of refining processes for the manufacture of a full line of petroleum products and also includes, incidentally, all the headaches that go with a process industry. His daughter, Gwen, is now a sophomore at Wellesley, living in Pomeroy Hall. Your Secretary had the pleasure of playing golf with Ab Johnson in late September when he came to Boston with his wife, Betty, and his daughter, Joanne, who is now in her senior year at Wellesley. Ab can really belabor that onion. In addition to being vice-president and general manager of Warner Machine Products, Inc., of Muncie, Ind., Ab has also been elected president and general manager of the Asbestos Manufacturing Company with plants at Huntington and Wabash, Ind. The Asbestos Manufacturing Company makes brake lining of woven asbestos fabric and clutch rings and facings for automobiles and similar equipment, including trucks, oil field machinery, cranes, steam shovels, elevators, hoists, and tractors. George T. Bailey has been elected president of Photogravure and Color Company, 207 West 25th Street, New York City. Harvey L. Williams has been elected to the board of directors of H. J. Heinz Company of Pittsburgh, manufacturers of the famous 57 Varieties of food products. He is supervising the overseas offices of the company which include factories and distributing organizations in Great Britain, Europe and Australia.

The following is quoted from the New York *Times* of September 16: "President Truman today accepted the resignation of Thomas J. Hargrave, president of the Eastman Kodak Company, as chairman of the Munitions Board of the National Military Establishment, and appointed Donald F. Carpenter of Southport, Connecticut, to succeed him. Mr. Carpenter has been serving as chairman of the military liaison committee of the Atomic Energy Commission since Feb. 29. He resigned from this post and Mr. Truman named William Webster ['23] of Boston, vice-president of the New England Electric System, to succeed him. Mr. Carpenter was a vice president of the Remington Arms Company when he took the atomic post. Mr. Webster was a director and chairman of the atomic energy committee of the New England Council, and also served as a consultant to the Atomic Energy Commission." George R. Prout, Vice-president of General Electric Company has been appointed assistant general manager of the company's nucleonics department, and on January 1 he will become general manager. Frederick S. Blackall's picture appeared in *Business Week* of August 28 along with the other directors of the New York, New Haven and Hartford Railroad.

Frederick Miles, Darien lawyer and chairman of the Darien town plan and zoning commission, died of a heart attack on October 5 while playing tennis at the Tokeneke Club in Darien. He is survived by his wife and two sons to whom the Class extends its sympathy.

Children's school addresses: Gwen Stose, daughter of Bill Stose, a sophomore at Wellesley in Pomeroy Hall. Joanne Johnson, daughter of Abbott L. Johnson, a senior at Wellesley in Tower Court. — C. YARDLEY CHITTICK, *Secretary*, 77 Franklin Street, Boston 10, Mass. WHITWORTH FERGUSON, *Assistant Secretary*, 333 Ellicott Street, Buffalo 3, N.Y.

• 1923 •

The space devoted to reunion matters in the last few sets of notes has prevented reporting a considerable number of personal items, some of which extend back to last spring. For example, in May, President Truman presented the John Wesley Hyatt award for the advancement of plastics to John D. Cochrane, Jr., of Cincinnati, director of research and development of the Formica Insulation Company. The Hyatt gold medal and a $1,000 prize were presented at the White House. Jack Cochrane is the seventh recipient of this award made annually since 1941. The award is named in memory of the father of the plastics industry who developed celluloid, the first thermoplastic, in 1867.

Roswell B. Daggett, captain, U.S.N., became supervisor of shipbuilding in April at the New York Shipbuilding Company's yard in Camden, N.J. — In April, Milton E. Parker was named professor in charge of the food technology program at the Illinois Institute of Technology in Chicago. — The appointment of John E. Burchard as dean of Humanities at the Institute was announced in May and has been duly reported in the regular columns of The Review. In June these three new positions were announced: Thomas B. Drew succeeded to the position of head of the department of chemical engineering at Columbia University. Tom is also a consultant to the Brookhaven National Laboratory. James C. Ruddell, Colonel, U.S.A., returned from duty in Europe and became the new commanding officer of Fort Hamilton, N.Y. Phil Lemler was elected vice-president and general manager of the Todd Shipyards Corporation, in charge of its operations in San Francisco Bay.

The Baltimore *Sunday Sun* of July 18

devoted considerable space to Weaver W. Adams, who won the United States open chess championship in that city over 74 other entrants. Adams practiced mechanical engineering until 1936, when he gave it up to devote his time to exhibition playing, lecturing and writing about chess. During the War years, he resumed his engineering profession but has subsequently renewed his chess activities. He lives in Dedham, Mass.

Fred D. Shaw is vice-president and general manager of the Bettinger Enamel Corporation of Waltham. The September issue of the magazine *Industry*, published by the Associated Industries of Massachusetts, devotes an article to this firm and its associates in their development of an increasingly popular method of industrial finishing for a wide field of fabricated products, ranging all the way from stoves and refrigerator parts, store fronts and steel signs, to elevator panels and doors and tremendous commercial baking oven panels.

In September, the papers carried the announcement that William Webster was succeeding Donald F. Carpenter'22, as chairman of the Military Liaison Committee to the Atomic Energy Commission, a position in which he serves as an aide to James V. Forrestal, Defense Secretary. Carpenter becomes chairman of the Munitions Board. Webster lives in Wellesley and was a vice-president of the New England Electric System and director of the Worcester County Electric Company. After graduation from Annapolis in 1920, he did graduate work in naval architecture at the Institute and became associated with the New England Power Company in 1928, with headquarters in Providence. He was active in civic affairs there and served various electric utilities, becoming president of the Narragansett Electric Company and the United Electric Railways Company.

George T. Gilman died on September 18. He had attended the 25th reunion at Cambridge and New London. He was a partner in the engineering firm of Moran Proctor Freeman and Mueser in New York, and lived in Norwalk, Conn. Two other deaths that have not been previously recorded: William S. Niekamp in August, 1947, and Felipe Cadenas, lieutenant commander, Cuban Navy, who was naval attaché at the Cuban Embassy in Washington at the time of his death in April.

One of the very interesting letters for which we do not have adequate space was written in April from Munich, Bavaria, by Albert C. Schweizer. Schweizer, a former architect, is now director in the civil administration division of the United States Occupation Forces in Germany. He got into the position (which will be familiar to many others who have handled similar assignments overseas) of finding himself so far behind in keeping up his letter contacts with various friends and acquaintances that he wrote a general letter, had it mimeographed and sent copies to those whom he wished to bring up to date as to his situation. He is living in Munich. His wife, Jean, and two daughters, June and Ann, he reports, have been with him for about a year and a half. June, he says, in two winters has become a local ski champion, in a place where people learn to ski young.

He devotes considerable space in his letter to comments on living conditions and our administrative policies in Bavaria. The following brief extract from his letter will be interesting. It shows a typically American approach to the problem of governing an occupied area and seems to have every chance of being just as effective as a stronger-handed policy: "My own job has greatly changed in the last couple of years. I still have the division which has overall supervision of the Government and Politics of the State of Bavaria. Originally we picked the officials, directed their operations and even suggested and wrote the laws and regulations under which they operated. Gradually the Germans have been given more and more responsibility. Leading officials were elected, organs of government were set up on a constitutional basis, parties were encouraged to form. Then we withdrew from operations and acted by direction and approval or disapproval. Lately we have withdrawn further to the position of mere advisors. The legislation in which we maintain interest we affect only by personal persuasion. It is characteristic that the new Land Director, former Michigan Governor Van Wagoner, believes his job to be chiefly one of public relations. It is significant, too, that the greatest effect we have on the Bavarian Government is that which comes from discussion at weekly lunches which he and I have with the Minister President and the head of the majority party. This control and influence by direction is a difficult and slow technique. That it can be effective is demonstrated by the joint American-German working group that I have organized here. On the German side, this small body includes leaders of government, church, trade unions, culture, scientists, businessmen, political parties, and several other fields. They are anxious to educate their people and are willing to bury differences in the process of doing so. It is essentially a planning group which is seeking means of showing the average citizen the democratic way of life. The Germans are willing and anxious to learn. We should have more good people here to give them leadership in that direction.

"We also need a great deal of printed material in many fields to bring the Germans up to date on what has been happening in the outside world. I, myself, am begging people to send books, pamphlets and periodicals which have been published in the last ten years in the fields of public administration, democracy and civil liberties, planning, building, and the like. Even if secondhand and in English, this material can be most helpful. It we send the Germans enough food to make them forget their hunger, it will lessen their dislike of us. If we can give them aid of a less material sort, it will reverse the antagonistic trend of their attitude and make them more ready to accept us and try out our principles." — HORATIO L. BOND, *Secretary*, National Fire Protection Association, 60 Batterymarch, Boston 10, Mass. HOWARD F. RUSSELL, *Assistant Secretary*, Improved Risk Mutuals, 60 John Street, New York 7, N.Y.

• 1924 •

On October 18, Nat Schooler and Bill Correale instigated one of the most successful gatherings of the Class which has been held in New York for a good many years. I am delighted to see that a 25 year reunion turns out some of our missing, but highly successful classmates. Among those present were Henry Liebman, who has just become chief engineer of the Sanitation Department of New York City; Mal MacNaught of the Atlantic District Sales of the McGraw-Hill Publishing Company; Jack Hennessy of Syska and Hennessy (designing the heating system for the United Nations Buildings in New York City; Bill Billard; Paul Cardinal (the vitamin king); Frank DiSomma, Bill Delehanty, Bill Blaisdell, Vice-president of Bludworth, Inc., Tom Bundy, Ed Shirey, Gregg Shea, Dave Evans, B. Alden Cushman, Bill Keplinger, Anatole Gruehr, Bill Rosenwald, Carl Vicario, Prett Littlefield, Ed Jagger, Henry Zeiger, Ray Hamilton, Tom Mattson, Frank Manley, H. H. Abdul Razzack who is recently back from India, and Chick Kane who favored us with a visit from Boston. Plans were laid toward active raising of our alumni gift and another meeting has been called for November 18, at which Bill Robinson will put in his appearance. We are trying for the Architectural League as a location, but the time and place of this dinner will be announced later as we may not be able to meet the minimum guarantee.

There are approximately 170 members of the Class in the greater New York area and we are setting a goal of $250 each toward the class fund. If we can meet it, we should present about $15,000 toward the $35,000 now needed. More on this later.

Bill Robinson reports from Cleveland that Earle Bates is with the General Electric Company in Washington, D.C. He is leaving for the West Coast shortly, returning to New York on the 18th. More news in the next edition. — FRANCIS A. BARRETT, *General Secretary*, 234 Washington Street, Providence, R.I. WILLIAM W. QUARLES, *Assistant Secretary*, McGraw-Hill Publishing Company, 330 West 42d Street, New York 18, N.Y.

• 1926 •

The Secretary has had the pleasure of receiving friendly letters from many members of the Class recently. Let me draw upon these letters to give you information about where people are and what they are doing. Whitney Ashbridge, who is in Caracas, Venezuela, with the Frederick Snare Corporation, says: "Down here we are mighty busy. For the last three months my boss, Bob Ellis (also '26) has been away in the States on vacation, leaving me to keep the wheels of progress turning in his absence. When I tell you that we are building a big ore transfer station that will handle three million tons of iron ore a year for the Iron Mines Company of Venezuela (subsidiary of Bethlehem Steel), wharves for oil companies, and are now well under way on a twelve million dollar contract for extending the port facilities of La Guaira, the port for Caracas, have just finished an

assembly building and office plant for General Motors, and so on, I think you will agree that time has not been hanging heavily upon my hands. I have run into quite a few M.I.T. men down here, both in private companies and in the various departments of the government. Felipe Echaniz, our office engineer, took a short course there during the War, so you see that our Caracas office has quite a bit of M.I.T. background. . . .

"My younger son, John, although not yet of school age, seems to be the engineer of the family, as he gets much pleasure out of fitting things together and playing with toys that come apart. To my surprise he seems to get as much fun in putting them together again as he does in taking them down. Our elder boy, Dick, goes to Campo Alegre School (English speaking), but he seems to be more interested in insects, flowers, and so on, than in anything pertaining to engineering. However, it is a little early yet to tell whether they will end up as students under you. Bob Ellis' elder son, Dick, graduates this year from prep school and is very much interested in the Institute's combined course with Williams, which sounds like a very good arrangement. . . ."

Jim Bamford is executive director of the Community Chest of Reading, Pa.; Sid Baylor is vice-president of the Eastern Appliance Company, Boston; Martin Bergen is in the engineering department of E. I. du Pont in Wilmington; Chet Buckley is works manager of the Taunton division of National Silver; Maurice Davidson is general commercial engineer for Bell Telephone of Pittsburgh; Al Dolben is a partner in the Boston real estate firm of William H. Dolben and Sons; John Drum is executive vice-president of Glascock Brothers, Muncie, Ind.; and George Edmonds is president of the Bond Manufacturing Company, Wilmington.

Guy Frisbie is assistant sales manager of the Hobart Manufacturing Company, Troy, Ohio; Jay Goldberg is research director for J. P. Stevens and Company, New York; Tom Green is with Hartford Empire; Mark Greer is vice-president of Edwin L. Wiegand Company, Pittsburgh; Sumner Gruzen is a partner in the New York firm of Kelly and Gruzen, architects and engineers; Wes Hemeon is engineering director of the Industrial Hygiene Foundation of America, Pittsburgh; Art Johnson, returned from his round-the-world hop, is now located in Boulder, Colo., where he has started a building product business of his own; Don King is assistant to the director of Union Carbide in New York; Joe Levis is president of Freeport Marble and Tile Company, Boston; John McMaster is with Negea Service Corporation, Cambridge; Malcolm McNeil is assistant secretary of Arkwright Mutual Fire Insurance Company, Boston; Ben Margolin is with Baird Associates, industrial physicists in Cambridge; and Bill Meehan is director of operations for the Great Atlantic and Pacific Tea Company in Boston.

Mooney Owen wrote: "I had hoped to see you this past summer in Boston, but due to a change in plans we did not come quite that far east, picking up the younger boy at camp in New Hampshire and driving on to Quebec, taking the Saguenay trip up the St. Lawrence River. On the return trip we went farther west." He was looking forward to seeing Harry Howard in Washington at the end of October. — Dudley Parsons has his own public relations firm in New York, the Dudley L. Parsons Company; Ben Richardson is engineer in charge of service for Electrolux in Old Greenwich, Conn.; Pink Salmon is assistant vice-president of the Merchants National Bank, Boston; Frank Schreiner is with Pratt and Whitney in Cleveland; Dave Shepard is Standard Oil's London representative; George Warren Smith is du Pont's New England representative; Elton Staples is Cleveland district manager for Hevi Duty Electric Company; and Elmer Warren is director of personnel for National Life in Montpelier.

I wish all of you would try to send me some personal news for The Review. — JAMES R. KILLIAN, JR., *General Secretary*, Room 3–208, M.I.T., Cambridge 39, Mass.

• 1927 •

The Class is represented in this month's Review because of a long letter received from Fritz Glantzberg. After two and a half years at the Air University at Maxwell Field, Montgomery, Ala., Fritz is now back in Washington as chief of a new division of the Directorate of Research and Development in the office of the Deputy Chief of Staff Materiel. More specifically the work will involve research and development in human resources. This is a subject in which the Colonel has done some detailed work in the past. He would like to hear from visitors in Washington at Republic 6700, extension 71058 or at Glebe 5056.

I saw Paul Vaughan at the National Advisory Committee for Aeronautics' tour in Cleveland early in October. Unfortunately, we were all being guided along so rapidly that I did not get any basic data on him, but he was at the 20th reunion and was seen recently by many of us. — JOSEPH S. HARRIS, *General Secretary*, Shell Oil Company, Inc., 50 West 50th Street, New York 20, N.Y.

• 1934 •

We have a note from Oleg J. Devorn stating that he is now working for the division of architecture, State of California Civil Service Department of Public Works. Gilbert Lorenz is studying photochemistry at the Federal Institute in Zurich, Switzerland. Richard F. Miller was recently appointed assistant to the vice-president of the research technology department of the Carnegie-Illinois Steel Corporation. After receiving an Sc.D. degree in mining and metallurgy he spent two years as an instructor in the department of metallurgy, Sheffield Scientific School, Yale University. In 1936 he was employed as a metallurgist at the United States Steel Corporation Research Laboratory in Kearny, N.J. In 1943 he was transferred to the Carnegie-Illinois Steel Corporation at Pittsburgh where he was in charge of the development work on stainless steels. On June 1 of this year he received his present promotion. The Millers are now living in Mount Lebanon and have two boys, Thomas Franklin, aged 6 and Crispin Sawyer, aged 3.

Arthur J. Leydon of Waltham, Sachem Council commissioner, received the Silver Beaver award for 1947, the highest award in scouting, at the 26th annual banquet of Sachem Council, Boy Scouts of America. Governor Bradford was the speaker and there were more than 400 men and women present from the eight districts of Sachem Council. Commissioner Leydon has been in scouting for 20 years. He became a Boy Scout when 12, and the next summer he went to camp and became an Eagle Scout. He was one of the youngest Eagles in the state at the time. Arthur has been very active in civic affairs of Waltham. His recent activities have included chairmanship of the cancer control committee for Waltham last year. He is also vice-president of the Waltham Better Gardens Club, and teaches Sunday School at the Church of the Messiah in Auburndale, where he was formerly a vestryman. He has been employed as a research chemist at the Dewey and Almy Chemical Company in Cambridge for the last 14 years. Omar Somers '33 recently gave a talk entitled "Tools for Dimensional Quality Control" before the Western Massachusetts Society for Quality Control. Omar is working with the Standard Gage Company, Inc., of Poughkeepsie, N.Y. He has spent 9 years in development, sales and production engineering in the chemical, telephone and gage industries and five years in the Army as a production engineer on tanks, armored cars and other combat vehicles. Elizabeth Close recently received an interesting review in the Minneapolis, Minn., *Tribune* concerning her architectural work. She is in business with her husband, Winston Close'35. She was cited by the *Architectural Record* as one of ten women architects who have done outstanding work.

Peter J. Carlaftes owns and operates the Olympic Lodge in Deering, Wash. It is a fishing and summer place with cottages and other facilities for outdoor life, and certainly sounds like a pleasant way to earn a living. A recent note from Bob Ralston states that Art Esslinger is back with McCann-Erickson, Inc., and that Ed Asch is back east again with Vickers, Inc. Frank R. Milliken has been appointed plant manager of the National Lead Company's titanium division at Tahawus, N.Y. Frank was an engineer with the Utah Copper Company before joining National Lead in 1941. — Commander Rufus A. Soule, 3d, has been appointed as commanding officer of the Worcester Battalion, Organized Naval Reserve. — JOHN G. CALLAN, JR., *General Secretary*, 184 Ames Street, Sharon, Mass. ROBERT C. BECKER, *Assistant Secretary*, Chile Exploration Company, Chuquicamata, Chile, S.A.

• 1935 •

Herb Thomas, a colonel in the Army Air Forces Reserve, is living in North Quincy. During the War, Herb was a signal officer at Maxwell and Morris fields. Later he had charge of the Army Air Forces Communications Inspection Section, Washington, D.C. Before the War, Herb worked for General Electric and

your Secretary assumes he has returned to that company's employ. Larry Stone was an ordnance officer at the Springfield Armory for several years. In June, he graduated with the highest scholastic rating from the advanced ordnance officers training course at Aberdeen Proving Grounds. Larry, a major, has gone to Germany with his wife and two daughters for duty with the Army in Europe. – Bill Stevenson was married to Jean Goodie of Bridgeport, Conn., in May. Bill works for Du Pont in Toledo, Ohio.

Alden Tower, a naval architect at the Fore River Shipyard, received a cash award from the Navy this spring for one of his designs. Alden is married, has two youngsters, and lives in North Weymouth. Francis Fenlon is supervising engineer of a power plant design group for Devenco, Inc., industrial consultants. Rather than transfer to Texas with Chance Vought Aircraft, Zay Curtis has moved from Fairfield, Conn., to Fostoria, Ohio, where he and two of his associates found a better business opportunity. Johnnie Duff is running for state senator from New Bedford. Johnnie is a seasoned political figure, having been elected councilor-at-large with the highest vote in the contest in 1938 and having served as council president in 1940. He was a lieutenant commander in Naval Aviation during the War and has retained that rank in the Organized Reserve. John is an officer of David Duff and Son, a fuel concern in New Bedford. Jack Burton is board chairman and president of the National Bank of Far Rockaway on Long Island. He was a colonel of ordnance attached to Eisenhower's headquarters staff in England during the War and since that time has been a member of the United Nations' atomic energy committee. He is married to an English girl and has two sons. Jack can drive a farm tractor, too. I know, for we spent a week end together on a Princeton chap's farm in September.

It is my unpleasant duty to record the death on August 12 of Charles C. Wilson, former assistant to the secretary of the American Institute of Electrical Engineers. Charlie had worked previously for the Ward Leonard Electric Company and lived with his wife in Mount Vernon.

I am still with the Remington Arms Company and was recently put in charge of production control at our ammunition works in Bridgeport. It has been a long time since 1935 notes appeared in The Review. It has been longer since a 1935 alumnus helped out. How about it? – J. BARTON CHAPMAN, *General Secretary*, 7 Lalley Boulevard, Fairfield, Conn.

• 1937 •

Many of you will be glad to know that Bill Burnet is back in Minneapolis. Besides being the prodigal son, he is research engineer for the Superior Separator Company. We hear that Ed Mosehauer has recently been appointed chief design engineer at Hamilton Standard Propellers, division of the United Aircraft Corporation. He lives at 301 North Quaker Lane, West Hartford, Conn. The Class of '37 appears twice in the *Hamilton Standard News*. George Rosen was recently promoted to chief aerodynamicist. He lives in Manchester, Conn.

Bob Bluestein was recently married to Athalie Titman Lazarus at the Woodmere Club in Brooklyn. Bob served with the Signal Corps in the European theater of operations for three years. – We hear of the successes of Henry Blackstone, who started the Servo Corporation of America two years ago. The company now employs 120 persons. John Gibbs is director of engineering facilities.

Your Assistant Secretary is taking a two weeks' course at the Industrial College of the Armed Forces in St. Paul. – WINTHROP A. JOHNS, *Secretary*, 34 Mali Drive, North Plainfield, N.J. WALTER T. BLAKE, *Assistant Secretary*, Research and Products Development, Pillsbury Mills, Inc., Minneapolis 2, Minn.

• 1938 •

Last June we had our 10th reunion; a very successful one with a turnout of 76. Because of this our Class has prepared a special set of notes and reports from the reunion which is being sent to everyone in the Class. Suffice it to say that the reunion was a fine success. We had a good hotel, excellent food, good weather, and most important of all, a great deal of fun catching up on jobs, wives, children, and changes in the middle dimension. Our new class officers are Arch H. Copeland, Jr., President, Albert O. Wilson, Jr., Secretary, and Dale F. Morgan, Treasurer.

We have word of four weddings during the summer. On May 1, Anne Hopper of Towson, Md., was married to Stephen du Pont. On May 29, Suzanne H. Ford was married to Peter de Florez at the Park Avenue Christian Church in New York City. On June 6, Nancy Wilson was married to Scott Lyon at Westbrook, Conn. Scott and his bride left for a wedding trip to Europe and then went on to Moscow where Scott, who has been with the State Department for eight years, was stationed. They later went on to the United States Consulate in Vladivostok and you may have seen the picture of the pair in a September issue of *Time* in connection with the closing of our Russian Consulate. On July 24, Jane Aufsesser was married to Theodore Lisberger in Canada Lake, N.Y. Theodore is on the employee relations staff of the General Electric Company in New York.

On August 13 Loraine Gilmore was married to Bernard Mehren in La Jolla, Calif. Bernie and his bride spent a month in the Pacific Northwest and then returned to La Jolla where they are now living.

The engagement of Virginia Black to Richard DeLong was announced in Brookline on September 2. Dick is working in Buffalo, N.Y., as a research chemist. On September 10 another class engagement was announced – that of Frances Gelernter to Jack Rosenberg. Jack was in the Army Signal Corps during the War and is now a design engineer for the electronic computer project of the Institute of Advanced Study at Princeton.

Clayton Mersereau is connected with the Middlesex Implement Company in East Acton, Mass. Art Gould is on the staff at Lehigh University and is also studying toward his master's degree. We have heard from an undergraduate at Lehigh that Art is an excellent professor and teacher. Given Brewer has been named acting manager of the Massachusetts Air Industries and Air Industries Flying School at New Bedford, Mass.

On June 24, Marilyn Cecile was born to Gus Rossano and his wife, and on August 18, Louise and Dick Muther had their first child, Laura Louise. – John C. Kinnear, Jr., has been appointed assistant to Walter S. Larsh, general manager of the Nevada Mines Division of the Kennecott Copper Corporation at McGill, Nev. Kinnear was transferred from the Chino Mines Division in New Mexico. – Charles J. Harrington, who received his doctor's degree with us and who has been technical representative of the DuPont Company in London, England, is now manager of the DuPont office in that city. On page nine of the June issue of *Pic* magazine, there was an interesting article about Bob Robbins. Bob was the test pilot who first flew a Boeing XB-47 Stratojet experimental jet bomber, but Bob said that the 51 minutes in the new giant bomber was easy compared with his experience three weeks later in the maternity hospital when his son was born.

The Kusaka Memorial Prize in physics has been established at Princeton University in memory of the late Schuichi Kusaka, internationally-known, Japanese-born physicist and member of the Princeton faculty before his death last August by drowning at Beach Haven. The prize is to be awarded annually to the most promising student of physics at Princeton and will be provided for by the income of a memorial fund dedicated to Dr. Kusaka. In accordance with the wishes of the late scientist's family, Dr. Kusaka's savings have been turned over to Princeton University as a part of that fund. Several of the nation's most distinguished scientists, including Albert Einstein, Robert Oppenheimer, director of the Institute for Advanced Study, and Henry D. Smyth, chairman of Princeton's department of physics, are among the members of a committee sponsoring the fund. – A. O. WILSON, JR., *General Secretary*, 32 Bertwell Road, Lexington 73, Mass.

• 1939 •

Plans are being made currently for the 10th reunion which, as you know, will be coming up this spring. Any and all suggestions will be most heartily welcome and subsequent columns will give more details. In any event, mark your calendars for the 9th, 10th and 11th of June, the Alumni Day week end. The class festivities will be concentrated on June 10, followed by regular Alumni Day functions at the Institute on June 11.

The news arriving this time mentions that Ken Bell has been employed by the Stanolind Oil and Gas Company's exploration department in Casper, Wyo. Charlie Clift, we learn, was recently married to Martha Lura Walker, of Belmont. During the War, Charlie served in the Navy and received citations from the Navy and the Office of Scientific Research and Development for outstanding work in the field of radar. And the engagement of Ray Ed-

wards to Dorothy C. Heimburge was also recently made known. Ray is with the United Illuminating Company in New Haven, Conn. Burt Rudnick is engaged to Jeanne R. Park, of Natick. Burt served as a captain in the Army Air Corps for three years. — STUART PAIGE, *General Secretary*, 701 Mill Plain Road, Fairfield, Conn.

• 1940 •

James H. Moore has been promoted to director of the metals department of the National Research Corporation of Cambridge, Mass. Ieoh M. Pei, architect for the $4,000,000 King Wei Textile Machinery Manufacturing Corporation plant, Hangchow, China, and former assistant professor of architecture at the Graduate School of Design, Harvard University, has joined the Webb and Knapp, Inc., staff as architectural consultant for special projects. Pei entered the Harvard School of Design in 1943 as Wheelwright Research Fellow. During the same year he earned a traveling fellowship at Technology and, in addition, was appointed a Fellow, one of two such appointments in the Institute in 1940. Following his graduation, he practiced in various phases of architectural work in New York, Los Angeles, York, Pa., and Boston where he was associated with Stone and Webster until entering Harvard as a graduate student. Pei was born in Canton and plans to return home in due course. His duties with Webb and Knapp, Inc., will consist of architectural work in connection with projects involving large-scale planning.

We have been notified by North American that George Krebs'39, and Nick Pickard of our Class were killed in the crash of a B-45 near Alpaugh, in Tulare County, Calif. Nicholas Pickard, 31 years old, was a newcomer at North American, having been at the plant less than a year. He was born in Brooklyn, N.Y., and obtained a bachelor of science degree in general engineering with our Class. He was a maintenance engineer for Trans World Airline, Inc., until May 1941, when he joined the Royal Air Force air transport auxiliary as a ferry pilot. He subsequently joined the Atlantic transport of the Royal Air Force at Montreal, Quebec, then in 1946 became technical advisor of the International Air Transport Association, Montreal. In April, 1946, he joined Trans World Airline, Inc., again in Kansas City, Kansas, as an engineering test pilot and remained there until he joined North American. He is survived by his wife, Mrs. Kathleen Pickard and two children, Sandra, 2 years old, and Manya, 5 months old. The Class extends to the family a very deep felt sympathy.

Class members could send me Christmas presents by sending letters detailing the eight years of their lives since our graduation. Anyway, Merry Christmas. — H. GARRETT WRIGHT, *General Secretary*, Garrett Construction Company, Post Office Box 629, 510 Sherman Avenue, Springfield, Mo. THOMAS F. CREAMER, *Assistant Secretary*, 6 Berkley Road, Scarsdale, N.Y.

• 1943 •

Congratulations are due to Roberta and Virgil Otto on the birth of their daughter, Phyllis Claire, on October 13. Miss Otto "weighed in" at eight pounds and three ounces. From Seattle, Wash., we have heard that the former Erika Elyane Dessauer and Bailey Nieder were married September 9. Dr. and Mrs. Robert B. Seabury have announced the engagement of their daughter, Ann, to Guy Stearns. Miss Seabury is a graduate of Bradford Junior College and later graduated from the Cambridge Hospital School of Nursing in 1946. Guy has recently terminated five years of duty in the Army and has now returned to the Institute for graduate work. Jonathan Sprague, who went with the Merrimac Division of Monsanto Chemical Company immediately after completing his work at Technology, has been transferred to the Washington, D.C., office. In 1946, he was granted a leave of absence to attend the Harvard Business School. Frank W. Bowdish, who is teaching general metallurgy and mining at the University of Kansas, spent the summer in Lead, S.D., working at a local mine to get practical experience for his teaching.

As short as these notes are, there is more to them than you may suspect because I have a knotty problem for you. It is the custom for the 25-year class to make a substantial contribution to M.I.T. Admittedly we are not anywhere near being the "quarter century" class, but we have the ticklish problem of raising our gift (and class gifts run around $50,000) during the next 20 years. On the average this is a contribution of about $55 per man in the entire Class or $85 per person who was an undergraduate in the Class! See what I mean about being a poser? My problem and yours is to raise this fund painlessly and without starving our wives and children. You can see why it is desirable to sneak upon it gradually by getting started soon. I am using this opportunity for a preliminary canvass of your ideas on how to raise the money. Give it some thought and write me a note about your views on how to collect the fortune.

Although it now seems a little early to be thinking of Christmas, you will not read these notes until December, so I shall take this opportunity to wish you a very merry Christmas and happy and prosperous New Year. — CLINTON C. KEMP, *General Secretary*, 29 Verlynn Avenue, Hamilton, Ohio.

• 1944 (2-44) •

Tom Morgan is in the entering class of the Harvard Business School and is living with his wife in the Riverside apartments. He just finished getting his second degree at the Institute. Dave Jealous dropped down a little while ago for a visit in the "Bean City." He is a test engineer with General Electric Company. Mal Kispert is still at the Institute as assistant to our new President, Dr. James R. Killian, Jr.,'26. Mal is working on our reunion party to take place next June. In case you men have forgotten, we will be the five-year class at that time.

My roommate is none other than Clyde Snyder'46 who is taking a post graduate course at the Harvard Business School. Clyde spent this summer touring Europe in an effort to broaden his education. Since he has returned he has been taking me out to eat what he calls various continental foods. Sten Hammarstrom'48 was graduated from the Institute in June. I ran across Al Hart'47 at the Boston Army Base at an Army Reserve meeting this week. He is married and works for a small contracting outfit in Boston. Frank Carroll'47 has left his job in Chicago and has moved farther west to Des Moines, Iowa. Bud West is with Brewer and Company in Worcester, Mass. Dick Bettes is now with the Standard Oil Company of Indiana and lives in Chicago. Frank Sanders is with the Arabian American Oil Company in Saudi Arabia. Tom Lawson has become engaged to Nancy Jane VanAnden of Scarsdale, N.Y. She is a graduate of the Briarcliff Junior College. Tom is now associated with the International Business Machines Corporation. Richard Hanson has married Elizabeth Andrews of Cashmere, Wash. Their honeymoon plans included a motor tour of the state of Washington where they will make their future home. Warren Bishop is a sales engineer for the Howland Davis Oil Company in Rochester, N.Y. — WILLIAM B. SCOTT, *General Secretary*, Mellon C-41, Harvard Business School, Boston 63, Mass. MALCOLM G. KISPERT, *Assistant Secretary*, Room 3–245, M.I.T., Cambridge 39, Mass.

• 1945 (10-44) •

This coming June has been set for our first five-year reunion. The time, place, and activities will be discussed soon. If you have any ideas that you think would make this gathering more fun, send them in. All printable proposals will rate discussion in this column for the next few months. One suggestion is to list, in the May Review, the names of the fellows who plan to attend. To include your name, I will have to be notified before mid-April. You are hereby given an early notice. You will probably recall the regular pleadings of these past few years for letters to fill this column. In the coming year things are going to be different; no more nagging for news. As an innovation, guest editors of class notes will be invited personally, and when you get your invitation, please R.S.V.P., if you please.

Jim Finneran, Jr., has left Oak Ridge to work for Hydrocarbon Research, Inc., in New York City; Ensign Jack Uretsky is stationed at Pensacola, Fla.; Harvey Travers is making the six months' circuit of the Chemical Engineering Practice School for his master's degree; Ed Costello is taking advanced flight training at Jacksonville, Fla.; Fred Ashbrook is in the Research and Development Electronics group at the Naval Ordnance Test Station, China Lake, Calif.; Hal Gillette is with the Good Roads Machinery Corporation in Minerva, Ohio; Parvis Yekta is in the Ministry of Foreign Affairs at Teheran, Iran; Jack Walsh is an ensign aboard the U.S.S. *Clark* in the Pacific; Frank Laurenzano, lieutenant, U.S.N.R., has been transferred from the Naval Reserve Officers Training Corps of the Rensselaer Polytechnic Institute to the 124th Construction Battalion in Adak, Alaska; Larry Klein is with the National Bureau of Economics Research in New York City; Augustus Polemis is working for Goulandris Brothers Ltd., of

London, England; Hank Tillson has received his master's degree and is well on his way toward a doctorate at Pennsylvania State College.

In the romance and family departments we shall list first the following engagements: Joan Wolf of Pennsylvania State College and Columbia University to Al Parsons; Martha Patricia Pascale of Katherine Gibbs to Leavitt Pope now working for the New York *Daily News;* Lucille Plasman of Middlebury College to Paul Grosse, professor of electrical engineering at the Naval General Line School, Newport, R.I.; Betty Sheffield to John Cross of the University of Pennsylvania.

Marriages in chronological order: Harriett Hall of Smith College to Don Tucker who is now attending the Boston University School of Medicine; Ann Caldwell of Pine Manors and Smith College to Bruce Fabens, who recently graduated from the Harvard Business School; and Anne Marie Gannon of West Orange, N.J., to Frank Nolan.

Bob Ayling named his second son, Bob, Jr., this May. The latest announcement was of Gay Ellen born to Howard and Thelma Lockwood. Howard is a research physicist in the plastics division of the Monsanto Chemical Company in Springfield, Mass. — JAMES S. MULHOLLAND, JR., *General Secretary,* Reinhold Publishing Corporation, 330 West 42d Street, New York, N.Y. JAMES B. ANGELL, *Assistant Secretary,* M.I.T. Graduate House, Cambridge 39, Mass.

• 1945 (6-45) •

Catching up on recent marriages in the Class, we notice several. Bill Loeb and Stella Munzer were married in New York last June. Elizabeth Esau became the bride of Ed Washburn, who is now employed by Stone and Webster Engineering Corporation. They live in Braintree, Mass. Another wedding was that of Romeo Favreau and Irene Berube, in Salem, Mass. They are living in Los Angeles, where Romeo is a radio engineer at the Hughes Aircraft Company. Ross Graves has received his Ph.D. degree from the University of Minnesota, where he is an assistant professor in the mathematics department. He was married to Marian Hamer of West Roxbury, Mass., in the University Chapel in August. Another recent marriage was that of Jim Barrabee'48 and Marcia Wolper of Brookline, Mass. Sam Moore,XIII, received his commission as an ensign in the United States Coast Guard when he graduated from the Coast Guard Academy last June. He is married to Barbara Wallace of Springfield, Mass., and is stationed at Norfolk. Elberto Gonzales-Rubio, who is on the staff of the architectural department of Georgia Tech, wed Dorothy Harrison of Atlanta recently. Announcement has also been received of the marriage of Ralph Hodara to Dolly Azicri in Paris, France.

We hear that Julian Gammon, who has regraduated from Technology in Course XV, is now with the Mellon Institute in Pittsburgh. His engagement to Marion Moreell of Pittsburgh has been announced and a December wedding is planned. A fall wedding was planned for Sanford Neuhaus and Gloria Glassner of Newark, N.J. Sandy served as a research engineer on the atomic bomb project with the Kellex Corporation. He is now a chemical engineer with the Aurilyte Process Company, Newark, N.J. Elaine Bickford, who is a member of the faculty at Simmons College, has announced her engagement to Roger Bart'46 of New York City. A spring wedding is planned. A prospective M.I.T. student was born to James J. and Miriam Leff in the form of James Marshall Leff who arrived June 20. Robert D. Schmitt has received his M.S. degree from Harvard and he and his wife are living in Philadelphia. Frederick Test is one of 16 appointed to the Northeastern faculty this fall. Siegfried E. Penner has joined the Stanolind Oil and Gas Company's research department in Tulsa, Okla. — DAVID P. FLOOD, *General Secretary,* 57 Beech Street, Framingham, Mass.

• 1946 (2-46) •

Looking back to the spring of this year we find a number of items still undocumented such as the engagement of Gene Parish and Harriet Anne Dinsmoor of Newton Highlands. To be included, also, are the announcements of Wimpy Waldron and C. Virginia Pearson of Rumford, R.I.; H. McClure Johnson and Suzanne Bradford Briggs of Lincoln; Ted Henning and Laura Lee Snedeker of Minneapolis; Stephen H. Crandall and Patricia Estelle Stickel of Belmont; and Ralph Huschke and Virginia Earle Kincaid of Washington, D.C., and Ossining, N.Y.

The wedding notices of last spring were not as heavy as the previous year. Dick Krahe and Jean Juanita Roop of Cambridge were married on June 19 in Christ Church, Cambridge. Don Burke was best man for Dick. Bob Campbell and Doris Elaine McLetchie of Malden were married on July 3. Whit Whitaker and Nancy Neare Phillips of Upper Montclair, N.J., were married on June 26 in Upper Montclair. Among the ushers were Herb Jacques, Bob Hoffman, Bob Hinrichs'49, and Henry Pickford. Another June groom was "Battling Robert" Wentsch who married Rose Wichlatz of Jamaica, N.Y., on May 22 (close enough to be a J.g.). Mario Vinci was one of Bob's attendants. Socialites were agog when Frank Low and Clara Barnes Everett of Brookline were married in Trinity Church on June 7. Frank received his master's degree in physics at Harvard and is now finishing work for another at the Harvard Business School. Bill Jackson and Mary Stuart Otto of Scarsdale, N.Y., were married at the Church of St. James the Less on June 24. Ray Brown was best man and Bob Spoerl, Bill Schield, and Jim Craig were among the ushers. Guests included Glen Dorflinger, Rog Sonnabend and Seward Kennedy.

Bringing things up to date we have the engagement announcements of John W. Taylor, Jr., and Nancy Van Alen of Swarthmore, Pa.; and Charles H. Messerve, Jr., and Marion Jean Park of Scranton, Pa. Another spring announcement is that of Paul Constantineau and Madeline Teutonico of Lawrence.

In a fall wedding, Jim Waters and Faith Cabot Pigors of Framingham Center were married on September 11. On the same day Jim Craig and Diane Harrington of Montpelier, Vt., were married in Christ Episcopal Church, Montpelier. Rog Sonnabend was best man, while Glen Dorflinger, Ray Brown, Bill Jackson, and Bob Spoerl were among the ushers. Ned Tebbetts and Ken Davis were at the wedding. George Bailey and Lucile Elizabeth Duff of Riverside, Ill., were married on August 29. — JAMES S. CRAIG, *General Secretary,* 387 Harvard Street, Cambridge, Mass.

• 1947 •

Last spring your General Secretary, Claude Brenner, breezed into the Dean's Office, dropped the class files onto my desk, and hurriedly explained that he was off to his home in Johannesburg, Union of South Africa, for the summer. He told me that his return to this country was doubtful and asked me to take over his job as your Secretary until his residential picture had clarified. Further news from South Africa was very meager until last week when I received a long letter from Claude, parts of which I would like to quote below: "There is absolutely nothing doing in the areo line here, and thus my trip just became a holiday back to the old home town. I will be sailing for England in three weeks, leaving here on November 5 and arriving on November 19. Whether or not I'll remain in England I don't know. If it is a temporary visit I intend to remain about three weeks, and then I will return to the States. . . . I have been having a terrific time in South Africa and don't like the idea of leaving too much. I visited the game reserve last month for four days and was well rewarded with all types of animals. Even lions, as well as elephant, giraffe, hippo, cheetah, zebra, and so forth. It's quite an experience, seeing them all in their natural state. Best regards to all my friends." I know you will all wish to join me in extending to Claude our best wishes in his overseas ventures. We will be looking forward to his permanent return to this country.

As this is my first time at bat as your Acting Secretary, I will probably leave out many newsworthy items that should have been included. Moreover, some of the items have probably long since passed as "red-hot news." Nevertheless, here they are with my sincere promise to do better next time. Last June Jinny Ferguson and Bob Hildebrand'45 were married at Jinny's home in Lexington by Dr. Everett M. Baker, Dean of Students. They are now located on the West Coast. The Admissions office rejoiced at the announcement of this wedding, for it is felt that the possibility of their future offspring matriculating to an institution other than Technology is infinitesimal.

Other news on the marital front records the engagement of Donald Cottle, who received his S.M. in September, to Geraldine McCarthy of Cambridge. Lester Lechter was recently engaged to Evelyn Kauffman of Norwood. Lester received his degree in Architecture and is now chairman of the Norwood Planning Board. Art Blechstein is engaged to Ruth Rasp of Newtonville, and Tom Bell, one of Jim

McMillin's stalwart oarsmen before the War and now connected with Doubleday and Company of New York City, is planning to wed Ellen Wiggins of Brooklyn, N.Y. Bob Corless married Frances Pitts of Chestnut Hill last August.

From General Electric's far-flung empire comes word that Grant Umberger has recently finished that company's test program and has moved on to a special assignment. Grant is working for Trumbull Electric Manufacturing Company as a sales engineer. Last month Kenny Marshall, hale and hearty as ever, dropped in from Chicago to pay his respects before heading back to St. Louis where he will take a position with a leather goods manufacturing company there. Another lad who took Horace Greeley's advice is John Martin, who, with his wife, Nancy, has settled in Minnesota. John at present is training for administrative duties with the Minnesota Mining and Manufacturing Company. Apparently life in the Middle West agrees with the Martins because at least four pages of a recent letter from him were spent extolling the virtues of the surrounding countryside. — Please give a hand with these notes by passing on any class news to me at the address below. — JAMES L. PHILLIPS, *Acting Secretary*, Room 7–133, M.I.T., Cambridge 39, Mass.

• 1948 •

Once again marriages which have occurred, and those which are forthcoming, occupy the spotlight. Remember Techsapoppin week end when Dr. Compton and company chose a queen of M.I.T.? That queen, Dorothy Ann Williams of Wellesley College, is now Mrs. Walter Lowrie. Tom Cox was married in August to Jeanne Andre, a graduate of the University of Houston. Jay Lathrop married Marjorie Crampton, a June graduate of Lasell Junior College. Al Yurgelun was wed to Rita Tautkus of neighboring Brockton; Allen Stewart to Constance Given; and Edwin Hiam to Katharine Watson.

Bill Bertolet married Roberta Richardson the day after he received his diploma. The ushers were all fraternity brothers (Alpha Tau Omega) of Bill's: namely Jeremiah Lott as best man, Fred Adams, Dick Hinchcliff'44, and Herb Kaewert '47. The following month, another June graduate, Bill Cummings, got married; the lucky girl being Barbara Hansen, a graduate of Pennsylvania College for Women. Henry Warner and his recent bride, the former Ina Finkelstein, can be found at 337 Hobson Street, Newark, N.J. Hope Mayer, a 1947 graduate of Radcliffe College, became the bride of Alan Kay. After a trip to Europe, they are returning to Cambridge where Al will study for his Ph.D. at Harvard. Jean Russell was married to Robert Turkington, Phi Kappa Sigma, and they, too, are returning to Cambridge to live. Martha Findlay, of La Jolla, Calif., was married to Richard Lee in a naval ceremony in April, but word sometimes travels slowly. Mary Cunningham, another Radcliffe graduate, and Fred Bailey were wed in June and are now residing in Cambridge. The last marriage we received word of was that of Susan Keith to Ted Nichols. We doubt that you will be seeing Ted soon because he left July 25 for a position with the Standard Oil Company in Aruba, Dutch West Indies. Marriages among the ranks of graduate students in our Class include those of Martin Lessen to Elizabeth Scher, Walter Benzing to Ruth McBride, and Richard Barrett to Marion Donovan.

Notices have also been received of the following engagements: Carolyn Chase to Walter Hatch, Marilyn Prager to Sanford Klion, Beatrice Cook to Don Perkins, Sally Lou Mohr to Bob McClintock, Nina Hill to Dick Webb, Mina Young to Edgar Gilbert, Edna Ann Schott to Ezra Garforth, Daune Lindsay to Roy Evans, Betty Ann Williams to Frank McGowan, Sonia Feinsilver to Mort Lipschultz, Margaret Lewis to Jim Irwin, Elizabeth Clarke to Ed Swiedler, Jean Spinazola to John Avallone, Marian Dale Organ to Dick Hall, Patricia Andrews to Dave Knodel, Evelyn Childs to James Rattray, Robert Rowe to Patricia Sullivan, Hal Abroms to Judith Estrach of nearby Wheaton College, Walter Amadon to Jean Stearns, Dick Harris, your Assistant Secretary, to Rosemary Marble of Worcester and, currently, Radcliffe College, and Ralph Evans to Gloria Fowler, a senior at Wellesley. Ralph, incidentally, finished second in the Firefly class of dinghy yacht races at the Olympic games this summer.

Joe Yanciunas, formerly literary editor of *Voo Doo*, wielded his mighty pen again to win a nationwide college council award with his article on "How to Push a Slide Rule," an informal report on how to be happy at a technological school. We are wondering where Joe got his data for such a story. — Whit Mauzy is working in the Odessa, Texas, producing department of the Stanolind Oil and Gas Company. Bill Hosley is with the Eastman Kodak Company as a statistician in their statistical department. John Kirkpatrick is employed by the Arthur D. Little Company here in Cambridge.

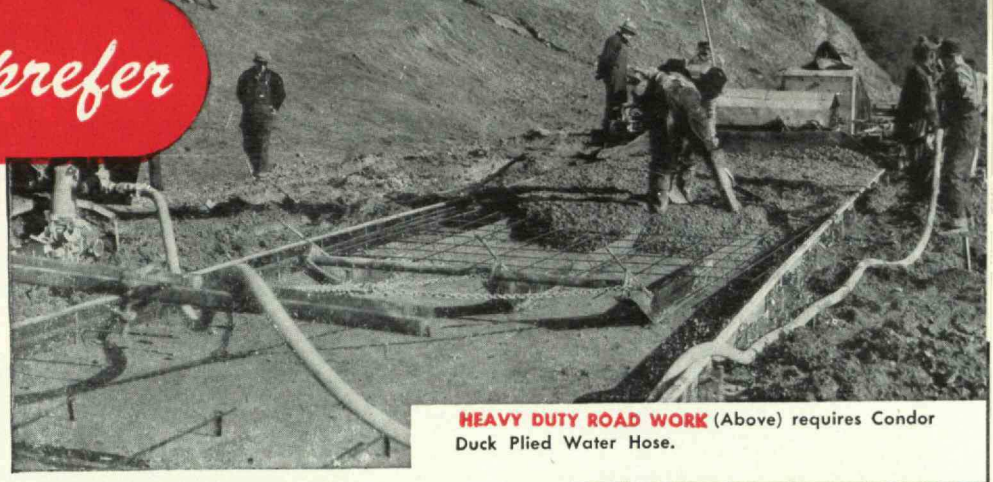
A letter was received the other day from Mary Burke, the Institute Committee secretary, containing interesting sidelights on the doings of some of our boys: "Uncle" Dave Cist, our Prexy, is apparently doing research for DuPont in Philadelphia; Ken Brock is working for an electronic equipment firm in Central Square here in good old Cambridge; John Weil and Jules Levin are working at Brookhaven after returning from a vacation in the wild and woolly mountains of Colorado; and, speaking of vacations, Ben Brettler apparently spent most of his summer in Europe before returning to the Institute in the fall. Carl Boll writes that he is returning to business school at that institution up the river; and Marty Billett writes that he is doing textile research for the Army at the Philadelphia Quartermaster Depot. From Obie Denison'11 we hear that Gardner Bent has entered his father's firm, S. Bent and Brothers, and is the first of the third generation in the firm. His father, incidentally, is Roderic Bent, a member of the Class of 1919.

Don Archer and Jay Lathrop are not straying too far from the academic life: the former is an instructor of industrial electronics at Wentworth Institute, and the latter is doing nuclear physics research at Technology.

Why not take pen and paper, or even a penny postal card, *now*, and drop me a line. What are you doing? Where do you work? At what? Are you married? What is the latest word from your old school chum? Let me hear from you, and you in turn will hear about your classmates. — WILLIAM R. ZIMMERMAN, *General Secretary*, M.I.T. Graduate House, Cambridge 39, Mass. RICHARD H. HARRIS, *Assistant Secretary*, 263 Harvard Street, Cambridge 39, Mass.

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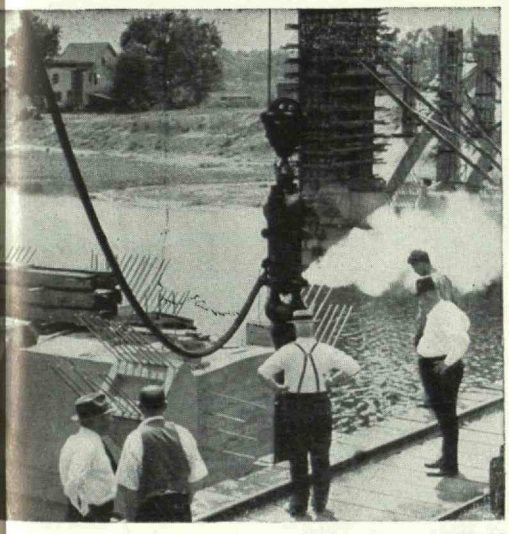
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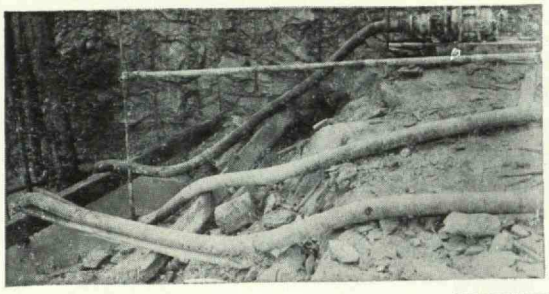


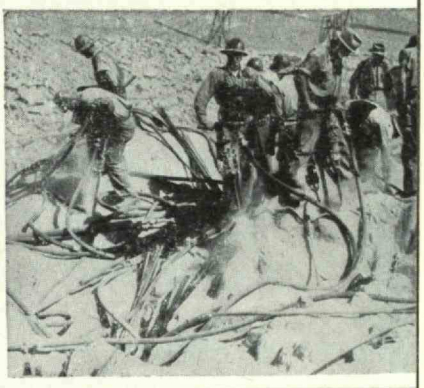
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PILE DRIVING (Below) with Condor Pile Driver Hose on a bridge project.

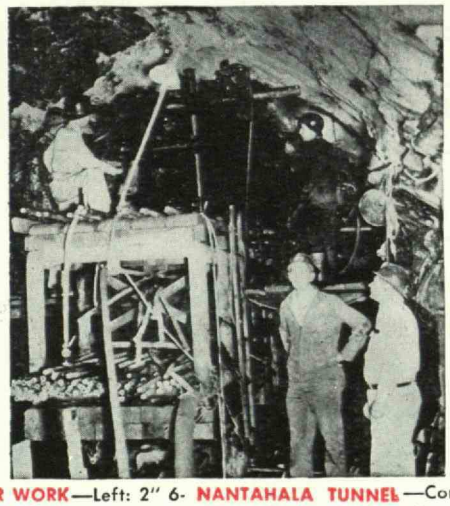
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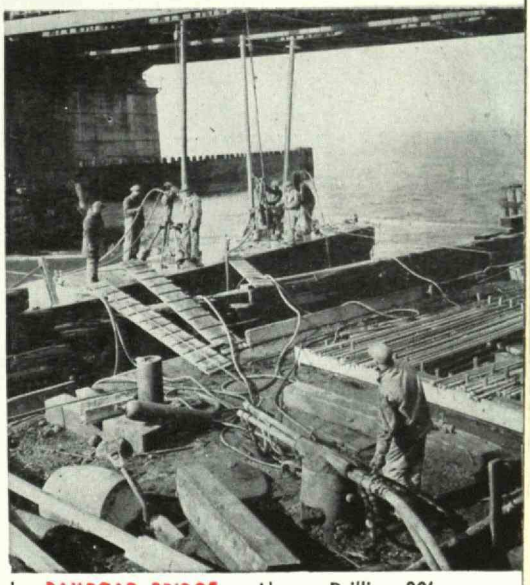


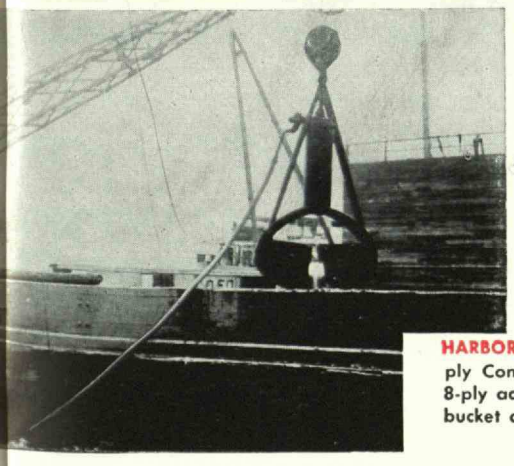




DAM EXCAVATION—Above: Draining low portion of a dam excavation, 300 G.P.M. against 90' head. Manhattan Suction Hose stands up on big jobs.







HARBOR WORK—Left: 2" 6-ply Condor Hydraulic Hose, 8-ply activating a clam shell bucket on a dredge.

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